CHAMBERS'S
ENCYCLOPAEDIA
A DICTIONARY
OF
UNIVERSAL KNOWLEDGE
NEW EDITION
VOL. VIII
Peasant to Roumelia

WILLIAM & ROBERT CHAMBERS, LIMITED
LONDON AND EDINBURGH
J. B. LIPPINCOTT COMPANY, PHILADELPHIA
1902

All Rights reserved
The following Articles in this Volume, originally Copyrighted in 1891, as now revised are Copyrighted by J. B. LIPPINCOTT COMPANY, in 1897 and 1900, In the United States of America:

<table>
<thead>
<tr>
<th>Pennsylvania</th>
<th>Poetry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peri</td>
<td>Prisons</td>
</tr>
<tr>
<td>Petroleum</td>
<td>Protection</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>Rabelais</td>
</tr>
<tr>
<td>Prenicia</td>
<td>Railways</td>
</tr>
<tr>
<td>Phonograph</td>
<td>Rhode Island</td>
</tr>
<tr>
<td>Pitt, William</td>
<td>Rivies</td>
</tr>
<tr>
<td>Pittsburgh</td>
<td>Rocky Mountains</td>
</tr>
<tr>
<td>Prof. Edgar Allan</td>
<td>Roman Catholic Church</td>
</tr>
</tbody>
</table>
Among the more important articles in this Volume are the following:

**PRESIDENT PROPHETS.** JESUS COLLIANS, M.P.
**PEKING** ............... Professor Legge.
**PELASGIANS; FLUTA** ..... F. B. Jevons.
**PELVIS** ................ Dr. David Hebrurn.
**PENDULUM** .............. E. A. Keane.
**PENNANT; HAPIE** ...... Frank D. Greene, M.A.
**PHILOSOPHY (Arts)** ... Lewis Col. Dunlop, R.A.

**NAVY** .................. Cape. Garnett, R.N.
**PENATECH; PETER** ...... Rev. J. Sutherland Black.
**PETS** .................. H. B. Wreathe.
**PERFUMERY** ............ C. A. Pierre.
**PERIODICALS** .......... W. T. Stead.
**PERSIA; PERSSEPOLIS** ... Major-Gen. Sir R. Murdoch Smith.
**PERU; PIZARRO** ........ Sir Clements R. Markham, K.C.B.
**PERSIMMON** ............ Professor W. Caldwell.
**PETERBOROUGH** ........ II. D. Thayl.
**PETRARCH** .............. Sigismund Cantagalli.
**PETROGRAPHY, &c** ...... Professor James Geikie.
**PETROLEUM** ............. Henry C. Foller, Junr.
**PHILADELPHIA** .......... W. S. Washington.
**PHILIPPINE ISLANDS** ... Professor A. H. Krane.
**PHILOLOGY** ............. John Pelle, LL.D.
**PHILOSOPHY, &c** ...... Professor Phineas Pattison.
**PHOENICIA** ............ Charles Rawlinson.
**PHONETICS** ............. Dr. A. J. Ellis.
**PHONOGRAPH** ............ Thomas A. Edison.
**PHILOSOPHERS** .......... E. W. Hyble.
**PHOTOGRAPHY** .......... T. C. Hepworth & T. W. Baseford.
**PHILOSOPHY; PLANTS** ... Norman Wylde.
**PIANO** .................. J. F. Rowbotham.
**PICTURES** .............. A. M. Bay.
**PICTURE** ............... F. T. Cunningham.
**PINDAR; PLAUTUS** ...... John Mason.
**PINE** .................. W. Sutherland.
**PIQUET; POKER** ......... Henry Jones (‘Cavendish’).
**PISCICULTURE** .......... Sir James G. Maitland, Bart.
**PICT** .................. W. E. H. Locky, M.P.
**PITTSBURGH** ............ B. C. Jillson, M.D.
**PLANETS; PTOLEMY** .... Rev. E. B. Kirk.
**PLATO** .................. D. G. Ritchie.
**PLEURO-PNEUMONIA** ... Principal Williams.
**PLIQUE; POTATO** ....... James MacDonal.
**PLUTARCH** .............. Rev. H. A. Holdens, LL.D.
**PLYMOUTH** ............. F. N. Worth.
**PNEUMONIA** ............. Dr. Lunde.
**POACHING** .............. C. N. Johnstone.
**POE, EDGAR ALLAN** .... Rev. Professor F. M. Bird.
**POETRY** ................ Edmund Gosse, LL.D.
**POISON** ............... Professor Ralph Stockman.
**POLEN** .................. R. W. Morrill.
**POLAR EXPLORATION** ... John S. Kellett, LL.D.
**POLAR, CARDINAL** ...... T. G. Law, J.L.D.
**POLICE** ................. James Monro, C.B.
**POLITICAL ECONOMY** ... T. Kirkup.
**POLYNESSIA** ............. Professor A. H. Krane.
**POMPES; PLINT** ......... Dr. J. F. Steele.
**POOR-LAWS** ............. W. C. Smith.
**POPES** .................. Rev. W. Hunt & F. A. Garquet, O.S.B.
**POPE, ALEXANDER** ...... Dr. H. D. Traill.
**POSITIVISM** ............ James Oliphant.
**POULTRY; RINO** ......... James Paton.
**PICKER** ................ Edward Browne.
**PRAETER-BOOK** .......... Bishop Dowden.
**PRESIDING; PHILO** ...... Thomas Davidson.

**PITIANCE** .............. J. Balfour Paul.
**PRE-RAPHAELITISM** ...... W. Holman Hunt.
**PRINTING** .............. John Southward.
**PRIOR; FRAZIO** ......... Austin Dobson.
**PRIESTS; E. D. CONN** ... Sir E. D. Cone, K.C.B.
**PRIORY-COUNCIL** ...... A. Wood Renton.
**PROBABILITIES** .......... E. E. Anderson.
**PROFIT-SHARING** ....... Robert Cochrane.
**PROTECTION** ............ W. Draper Lewis.
**PROTOPLASM** ............ J. A. Thomson.
**PROVENCAL** ............. A. P. Goudy.
**PROVERBS; QUEVEDO** .... John Gossby.
**PRUSSIA** ................ Findlay Murhead.
**PSALMS** ................ Professor T. K. Cheyne.
**PSYCHOLOGY** ............ Professor Sorley.
**PUERPERAL FEVER** ....... Dr. Milne Murray.
**PUFFLIES** ............... Henry Tinsen.
**PUNNY** .................. Rev. J. G. Johnston.
**PYRAMIA** ............... Professor Alex. Napier.
**PYRAMIDS** .............. Stanley Lane-Poole.
**QUIRATIONS** ............ Professor Knott.
**QUEBEC** ................ Dr. Stewart & J. G. Coleman, M.G.
**QUEENSLAND** ............ W. Senior.
**QUITO** .................. W. Dundas Walker.
**RAEULIS; REYNOLDS** ... Sir Walter Besant.
**RAEURN; RENNOLDS** .... J. M. Gray.
**RAILWAYS** ............... E. McDermott, of Railway News.
**RAINE** .................. Dr. Duchan.
**RAINBOW** ................ W. T. Godson.
**RALEIGH; RAGINE** ...... Thomas Davidson.
**RAHIL** .................. Sir Joseph Crowe, C.B.
**READ, CHARLES** ......... P. Hinde Groome.
**RECEIPTS; RECORDS** .... Walter Rye.
**RED SEA** ................ Sir John Murray.
**REFLECTION** ............ Dr. Alfred Daniell.
**REFORMATION; RENAN** ... P. Hume Brown.
**REFORMATORS** .......... Sir E. F. Cooke, K.G.B.
**REFRACTION** ............ Dr. Alfred Daniell.
**REGISTRATION** .......... Francis Watt.
**RELIGION** .............. Professor Flint.
**REMBRANDT** ............. P. G. Hamerton.
**REPRESENTATION** ...... Thomas Raleigh.
**REVOLUTION** ............ Thomas Jefferson.
**REVITALIZATION** ......... Norman Wylde.
**RESTITUTION** ........... Thackeray Turner.
**REVOLUTION** ............ Rev. J. Sutherland Black.
**REVOLVER** .............. W. W. Green.
**REVY** .................. J. T. Bealby.
**RICHARDSON, SAMUEL** ... Austin Dobson.
**RICHTER; REUTER** ...... J. T. Bealby.
**RIDING AND DRIVING** ... Captain Hayes.
**RIPLEYS** ............... Major-General Arbuthnot.
**RIGHT-HANDLESSNESS** ... James Shaw.
**RIGHT OF WAY** .......... G. E. W. Mactherson.
**RIVER** .................. Dr. Hutton Mill.
**RODNEY** ................ Professor J. K. Laughton.
**ROGERS** ................ F. Hinde Groome.
**ROMAN CATHOLICISM** ...... Rev. W. L. Gildea, B.D.
**ROMANCES; ROLAND** ...... John Omsby.
**ROBERTSON, Sir E. F.** ... Professor C. G. Robertson.
**ROME (Topography)** ...... Cardinal Isaac Taylor.

The Publishers beg to tender their thanks, for revising the articles ‘Penance’ and ‘Roman Catholic Church,’ to His Eminence Cardinal Manning; for ‘Pittsburgh,’ to Mr Andrew Carnegie; for ‘F. W. Robertson,’ to Rev. Stopford A. Brooke; for ‘Rosmini,’ to Father Lockhart; for ‘Profit-sharing,’ to Mr Alfred Dolok; for ‘Positivism,’ to Mr Frederic Harrison; for ‘Rochester,’ to Prebendary Levett; for ‘Peterhead,’ to Sir John Coode; and to the town-clerks of Peterborough, Preston, Rochdale, Rotherham, &c.
Peasant Proprietorship is a system of cultivation of small holdings of land by occupiers who own the land, or hold it on some secure or permanent tenure. Perhaps there is no question on which there is a greater diversity of opinion. On the one hand the small cultivator is held up as a pattern of industry, thrift, and prosperity, and on the other as an example of unceasing toil and miserable failure.

Arthur Young held that the best system of agriculture was that which secured the largest amount of produce from the land. It is evident, however, that another consideration of great importance must be taken into account—viz. the numbers, quality, and condition of those engaged in tilling the soil. Though nations might attain to brilliant positions by trade, commerce, and the accumulation of wealth, yet the permanent strength, the solvency, and resisting power of a country must closely depend on the number and condition of its rural population. Hence if it could be proved that vast areas of land could be cultivated at the greatest money profit, by means of machinery and a handful of labourers, yet such a method of cultivation would be adverse to the real interests of the nation as a whole.

There is substantial evidence, however, that small holdings of land are more productive in proportion than large farms, and that they are specially adapted to the production of certain kinds of food. It is from these causes that the rent value and purchase price of the smaller holdings in continental countries are so much higher than are found to obtain with the larger farms of Great Britain. It is frequently quoted in opposition to this view that the yield of corn per acre is much greater in England than on the Continent. This comparison, however, is of little value from the fact that the average of continental production is much lowered through the low yields of poor land, hillsides, and wastes, which, if in England, would not be cultivated at all. The evidence of the Royal Commission on Agriculture (1880) shows that the vast majority of holdings in the Netherlands are from 10 to 30 acres, held for the most part by cultivating owners, and that the small and medium-sized farms are generally the best cultivated and managed.

Mr Jenkins, the assistant commissioner, gave many examples of what he terms 'intensive' cultivation in Holland. One of these is that of a man who owned 22 acres of land, and rented 10 acres more. He had thirty milking cows in the fields, and ten feeding beasts in the stall. He fed every year thirty beasts besides his own cast cows, and spent above £600 per annum for food, principally for winter keep.

Belgium is rather a country of small cultivators than of peasant proprietors. If we leave out of account the owners of very small plots of land, it is the small tenant-farmer who is the most important element in Belgian agriculture. In spite, however, of excessive rents, the insecurity and other drawbacks of tenancies as compared with ownership, Belgium is a striking example of the advantages of la petite culture. M. de Laveleye states that Belgium is the best cultivated and the most productive country in the world; and refers to Flanders, with land naturally the worst in Europe, as a marvellous triumph of care, industry, and forethought on the part of the cultivators. According to the report above quoted, the available supply of milk and its products per head of the population is in Belgium about twice as great as that in Great Britain. In most districts in Belgium the labourer is a petit cultivateur—i.e. while hiring himself out as a labourer, he cultivates and often owns a piece of land stocked with rabbits, pigs, poultry, goats, and sometimes one or a couple of cows. A man of this class in the Ardennes, who was working with his son for a farmer at five francs per day, was found on inquiry by the present writer to be the owner of a cottage with 6 acres of land, two cows, and other smaller
but little hired labour, every member of the family doing something useful on the little holding. The system develops a hardiness, a fertility of resources, an adaptation of means to ends, and an incessant industry that makes of the peasant proprietor a model of competition with hired labour. As owner of his little holding the peasant proprietor has no restrictions as to cropping or methods of cultivation. He has no doubts about compensation for unexhausted manures and improvements, and no uncertainty as to tenure. He can cultivate his land as long as he lives and pass it on to his children. He has lived on and successfully cultivated a few acres of land remarked to the present writer—The more I care for and work my land the more it gives me back; my little farm is my bank in which I put my labour and savings, which it pays me back with good interest.' It is often said that thrift, prudence and perseverance are peculiar to the peasant proprietor on the Continent, and are the cause of his success. The history of peasant proprietorship, however, shows that these qualities are the result and not the cause of cultivating ownership, productive habits, early marriages, and little thought for the morrow are the too frequent accompaniments of a condition in which there is no prospect in life beyond that of a mere wage-receiver. The great secret of success of peasant proprietorship is summed up by a British agriculturist: 'All improvements, the most industrious, the most intelligent, and the most successful.' The two great drawbacks of peasant proprietorship are excessive subdivision and the unlimited power of mortgage. The land-lender—whether he is a great estate or a small proprietor who has the right to sell a few acres will submit to any proposition to save money, and will borrow at any rate, in order to acquire more land. The money-lender on the Continent, like the 'goubeem' man in Ireland, is the chief cause of trouble and difficulty to the small cultivator, because the creation of peasant proprietorship in Great Britain, though much discussed, has not till recently been seriously entertained as a practical question. In 1889 the government appointed a Select Committee on Small Holdings, and the evidence contains practical information on the various modes of developing and improving the applicability of the system to Great Britain. The committee in their Report (1890) unanimously recommend that facilities should be given for the creation of small holdings, and they adopt the principles of Mr Jesse Collings' Small Holdings Bill. The general provisions of this bill are as follows: Local authorities are empowered by money's borrowed for that purpose from the state, to acquire land and to sell the same in small holdings not exceeding 60 acres each. Purchasers are required to pay cash a small proportion not exceeding one-fourth or one-fifth of the purchase money. A part of the balance is to be paid off by annual payments, but the remainder—a small proportion of the original cost—is to remain at a perpetual feu or quit-rent. This provision, while it protects the land-lender, removes the money-lender, at the same time makes the terms of purchase as easy as possible. It also enables the local authority to enforce the conditions provided against subletting and subdivision. The local authority is further empowered to let land on favourable conditions in small holdings not exceeding 10 acres each. The report of the Select Committee declares that the extension of small ownerships 'is a matter of national importance both in the interests of the rural population, and
also as adding to the security of property generally.' The committee recommend that a sum not exceeding in the first instance five millions sterling should be devoted to the experiment, and 'earnestly hope that no time will be lost in introducing legislation to give effect to their recommendations.' This report, followed by the announcement of legislation on the subject in the Queen's speech of 1890, and the acceptance by the government in 1891 of the second reading of the Small Holdings Bill referred to, may together be taken as the first practical steps towards the creation of a peasant proprietorship in Great Britain.

See, besides the reports cited above, that from H.M. representatives abroad, On the Tenure of Land in the several Countries in Europe (1869); Loveloy's works on the rural economy of Belgium (new ed. 1875) and the Netherlands (1864); Laverger, Économie Rurale de la France (4th ed. 1877); and W. T. Thornton's Plea for Peasant Proprietors (new ed. 1874).

Peasant War (Bauernkrieg), a great insurrection of the German peasantry which broke out in the beginning of the year 1525. The oppression of the peasants gradually increased, as the nobility became more extravagant and the clergy more sensual and degenerate. The example of Switzerland encouraged the hope of success, and from 1431 to 1517 there were risings amongst the peasants and the towns. A peasant rebellion took place in the Rhine counties in 1502, and another in Würtemberg, in 1514, both of which were put down without any abatement of grievances. The Reformation, by stirring up the desire of freedom, must be reckoned amongst the causes of the great insurrection, although Luther, Melancthon, and the other leading reformers, whilst urging the nobles to justice and humanity, strongly reproved the violent proceedings of the peasants. The Anabaptists, however, encouraged them, and peasant insurrections, quickly suppressed, took place in 1522 and 1523. In January 1525 the peasantry of the abbacy of Kempen suddenly assailed and plundered the convent. This proved the signal for a rising of the peasants throughout the south of Germany. Many of the princes and nobles at first regarded the insurrection as disorder and not as a national demand; it was directed in the first instance chiefly against the ecclesiastical lords; some, too, because it seemed to set bounds to the increase of Austrian power. But the Archduke Ferdinand hastened to raise an army of north-western Germany. Von Waldburg, a man of stern and unsparing character. Von Waldburg defeated and destroyed some large bodies of peasants, but was himself defeated by them on the 22d of April. Meanwhile the insurrection extended, and a number of towns took part in it, as Heilbronn, Mühlhausen, Fulda, Frankfurt, &c., but there was a total want of organisation and co-operation. On 25th March 1525 there appeared in Upper Swabia a manifesto, in which the insurgents demanded the free election of their representatives, the maintenance of the parishes, after maintenance of the parish clergy, to the support of the poor; the abolition of serfdom; the restoration to the community of forests, fields, and meadows which the secular and ecclesiastical lords had appropriated; release from arbitrary augmentation and confiscation of seigneurial duties, and rents; the equal administration of justice; and the abolition of some of the most odious exactions of the clergy. The conduct of the insurgents was not, however, in accordance with these moderation of their demands. They were separated at Rothenburg, destroyed villages and castles (more than 1000 in all), murdered, pillaged, and were guilty of the greatest excesses. A number of princes and knights concluded treaties with the peasants, conceding their principal demands. The regent of Marienberg, near Würzburg, gave time to their enemies to support them with their forces. Götz von Berlichingen (q.v.) was one of the captains of the besieging peasants, who, however, afterwards maintained, had forced him to lead them. In May and June 1525 the peasants sustained a number of severe disasters, and the Landgrave Philip of Hesse, the Saxon Dukes, the electors of the Palatinate and Treves, and Frundsberg were successful farther north. The peasants were everywhere treated with terrible cruelty; more than 300,000 were killed in Upper Germany alone. Multitudes were burned in the streets, and many were put to death with the greatest tortures. Würzburg and other towns which had joined them suffered the terrible revenge of the victors. It is supposed that more than 150,000 persons lost their lives in the Peasant War. Flourishing and populous districts were desolated. The lot of the defeated insurgents became harder than ever, and many burdens of the peasantry originated at this period. The cause of the Reformation and of German national life also was very injuriously affected. Similar peasant insurrections in other countries are treated of under TYLER, CADE, KET, JACQUERE, SPARTACUS.

See works by Jörg (1831), Cornelius (1861), Baumann (1877), Fries (1883), Hartfelder (1884; 2d ed. 1899); the histories of Germany; and works cited at LUTHE, &c.

Peatstone, or Pisolite, a coarse variety of Oolite (q.v.).

Peat, a substance formed by the decomposition of plants amidst much moisture, and to a certain extent, muds, and morasses, and sometimes described as a kind of humus or soil, formed by the accumulation of the remains of mosses and other marsh-plants. The remains of the plants are often so well preserved in it that the species can be easily distinguished. Reeds, rushes, and other aquatic plants may usually be traced in peat, and stems of heart are often abundant in it; but it chiefly consists in the northern parts of the world of different species of Sphagnum or Bog-moss (see Bog-plants). Mosses of this genus grow in very wet situations, and throw out new shoots in the spring. As their upper parts are decaying and being transformed into peat; so that shallow pools are gradually changed into bogs. Stools and trunks of trees often occur under peat in the British Islands and some general remarks may be made upon this subject. Mosses are so abundant, that similar stools and trunks frequently are met with occupying a middle position in many peat-bogs—i.e. resting on peat and covered by a variable thickness of the same accumulation. It cannot be doubted that the overturning of trees, whether by natural causes or by man's hand, would in many cases impede surface drainage, and so eventually give rise to the formation of bogs. But there is reason to suspect that the succession of 'buried forests' and peat so frequently seen in the bogs of northern Europe, is due to slow changes (see Post-glacial System). Peat is vegetable matter more or less decomposed, and passes by insensible degrees into Lignite (q.v.). The less perfectly decomposed peat is generally of a brown colour; that which is more perfectly decomposed is often nearly black. Most peat possesses a decided and powerful antiseptic property, which is attributed to the presence of gallic acid and tannin, and is manifested in the perfect preservation not only of ancient trees and of leaves, fruits, &c., but sometimes even of human bodies. Instances human bodies have been found perfectly preserved in peat after the lapse of centuries.

The formation of peat takes place only in the colder parts of the world. In warm regions the
decay of vegetable substances after life has ceased is too rapid. The surface covered by peat is very extensive. In England it is considerable; it is greater in Scotland, and very great in Ireland. Some large peat-bogs occur in the south of Europe, even near the sea, and in more northern regions the masses or bogs are still more extensive; they occur also in the United States, but more extensively in Canada and Newfoundland. For their physical characters and the mode of reclaiming them, see Bog, and Waste LANDS. Mere peat is not a good soil, even when sufficiently drained, but by the application of lime, manure, &c., it is soon converted into a valuable land, yielding excellent crops. A mixture of peat is often of benefit to soils otherwise poor; and for many shrubs, as rhododendrons, kalmias, whorled berries, &c., no soil is so suitable as one largely composed of peat.

Peat is the ordinary fuel of great part of Ireland, and is still much in request in the hillier parts of Scotland and England. In Holland, Denmark, and parts of north Germany it is in use for the same purpose. Peat is a light and bulky kind of fuel, and cannot be carried considerable distances without too great expense. Efforts have, however, been made to render it more generally useful, and to promote the reclaiming of bogs, by compressing it until its specific gravity is nearly equal to that of coal. For this purpose it is first reduced to a pulp, but the process has not yet been advantageously prosecuted on an extensive scale, though numerous machines for the purpose have been patented in Germany and in the United States.

Peat charcoal, made from uncompressed peat, is very light and incombustible, and therefore unsuitable for many purposes, but for others it is particularly adapted, and no kind of charcoal excels it in antiseptic and desorilizing properties. Peat charcoal is highly esteemed for the smelting of iron and for working and tempering the finer kinds of cutlery. Charcoal made from compressed peat is in density superior to wood charcoal, and is capable of being used as coke. But the conversion of peat into charcoal has not proved remunerative; and the attempts to obtain valuable products (pyroxylic acid, ammonia, inflammable oils, &c.,) from it, and from its destructive distillation have been similarly unsuccessful.

Peat, specially prepared, is very serviceable for horses' bedding, &c. As antiseptic, it has been used for laying on wounds. Flower pots are sometimes made of it; it is easy to transplant plant roots growing in them without loosening the earth from the roots, the pot being readily cut to pieces; and liquid manure applied outside finds its way to the roots.

Pecan. See PASTEsr, Silk.

Pecary (Dicotyles), a genus of the family Sudida, containing at least two species. They have fewer teeth (thirty-eight) than the ordinary swine (forty-four), and a very short tail. The name Dicotyles is derived from a gland upon the back, almost corresponding in position to the navel below. D. trygmat is found from Arkansas to Patagonia, and is about 3 feet long; but the larger and fiercer D. labiates only ranges from Central America to southern Brazil. The latter is exceptionally pugnacious, and, as it goes about commonly in herds, it is extremely dangerous to meet with. Even the jaguar is said to retire before several of these animals when handled together. Both species, which freely breed together, are usually to be seen at the Zoological Gardens in London.

Pechili, Gulf of, a land-locked extension of the Yenisei (q.v.), between the base of the Korean peninsula and the Chinese province of Sian-tung, into which the Pei-ho (q.v.) discharges.

Peck, a measure of capacity for dry goods, such as grain, fruit, &c. It is equivalent to two gallons, and is the fourth part of a bushel; it thus contains in Britain 534.548 cubic inches, and in the United States 537.936 cubic inches. The old Scotch peck of wheat was slightly less than the imperial (British) peck: of barley, about 1450 imperial peck.

Pecock, REGINALD, author of The Expressor of Over-Much Blaming of the Clergy, was most probably born in Wales; was a Fellow of Oriel College, Oxford, in 1417, and was ordained acolyte and sub-deacon in 1420, proceeding to deacon's and priest's orders in the two following years. His preceptors were the mastership of Whittington College, London, together with the rector of St Michael in Holin; the bishopric of St Asaph's, from Duke Humphrey of Gloucester in 1444, when he also received his degree of Doctor of Divinity, and of Chichester, through the patronage of the ill-fated William de la Pole, Duke of Suffolk, in 1450. A student of great learning and industry, he plunged eagerly into the controversies of the day, and compiled many treatises, of which the Bonet (c. 1440), on the main truths of Christianity, and his practical Treatise on Faith (c. 1456), written for the Lollards, are still extant.
PECOS

In the latter he gives up infallible authority in the church, makes faith a matter of probability rather than of knowledge, lays a broad foundation for a really rational piety, and makes a noble approximation to the doctrine of religious toleration. The object in the Pedigree (1456) was to promote the peace of the church by plain arguments against Lollardy, written in the mother-tongue. He main-
tained that bishops had higher duties than mere preaching, and strove with great patience and clear logic to demonstrate the reasonableness of those doctrines and ordinances of the church which the Lollards rejected as not founded on Scripture. Of a liberal and tolerant spirit far before his time, Pecock pointed out with much point and originality the teaching of natural religion about man's moral duties, asserting that the judgment of reason must not be overruled and twisted into conformity with Scripture, which rather confirms than serves as the authority for the light of nature. In his argument that Scripture pre-supposes a knowledge of the moral virtues, and that its special object is to make known those truths which reason could not have discovered, he is distinctly the forerunner of the great Hooker. His attack on the Donation of Constantine is an admirable piece of reasoning, and his argument that experience shows that there is no subject on which men are more likely to err than theological doctrine deals a deadly blow to the bibliolatry of Lollardy and Protestantism. Pecock's philosophic breadth and independence of judgment brought upon him the suspicions of the church, and especially of the friars, whom he had stigmatised as 'pulpit bailiers.' The storm of opposition to which he was gathering burst upon him out of the blue, and he was impeached before the archbishop Bourecher at Lambeth, where his writings were subjected to examination by twenty-four doctors. In the end he was condemned by the archbishop as a heretic whose doctrines were con-
trary to St. Augustine, St. Jerome, and St. Gregory, and the cruel alternative was put before him, to abjure his errors or be burned. He elected to abjure, made confession of many errors and heresies of which he had never been guilty, and with his own hands delivered to the executioner his three folios and eleven volumes; and thus he died; but he did not die in peace. Against the further sentence that he should be deprived of his see he appealed to Rome, and the pope indeed commanded him to be reinstated, but he was prevailed upon to resign his bishoprie into the hands of the king. The rest of his days he spent in the abbey of Thorney in Cambridgeshire. Forty pounds a year was allowed for his mainten-
ance; he was to have the service of an attendant, somewhat liberal diet, and a private chamber with a chimney and a passage leading from it which gave a sight of an altar and allowed him to hear mass. He was denied writing materials, and his books were but five—a breviary, a mass-book, a psalter, a legendary, and a Bible. He died about 1460.

See the article LOLLARDS; also James Gardiner's essays on 'The Lollards,' in Studies in English History (1881); the adduction to Churchill Babington's edition of the Repressor in the Rolls series (2 vols. 1860); and the Life by John Lewis (1774; reprinted, Oxford, 1820).

PECOS, a river of New Mexico and Texas, flows some 800 miles SSE. to the Rio Grande.

PEECTEN. See SCALLOP.


PECULIAR. See BENEFICE.

Peculiar People, a sect of Faith-healers (q.v.), founded in London in 1888. They reject medical aid in cases of disease, although not in surgical cases, and rely on anointing with oil by the elders, and on unceasing prayer, with patient nursing. They have their own collection of hymns, usually select their preachers from among the elders, and baptise their children when they are considered old enough to understand the ceremony and to express consent. Their communities are not numer-
ous, and the members are nearly all very poor working-folk; but they bear a high character for morality, honesty, and Christian charity.

Pedestrianism. See ATHLETIC SPORTS.

Pedicularies, very remarkable minute structures on the skin of sea-urchins and starfish, having the form of a stalk with a three-bladed or two-
bladed snapping forceps at the summit. They take hold of algae preparatory to the application of the se sentorial feet, and probably help likewise to keep the surface of the echinoderm clean.

Pedicularis, a genus of herbs of the natural order Scrophulariaceae, some of which have rather large and finely-
coloured flowers. Two species, P. palustris and P. sylvan-
tica, are natives of Russia and of Britain, common in wet grounds. Both have received the name of Love-wort, the English equivalent of 'pedicularis,' from their supposed influence in produc-
ing the lovesickness in sheep—a notion purely imagin-
ary. Their acridity renders them obnoxious to sheep; but cattle, goats, and swine eat them. Continental herbalists, and the northern parts of Asia produce many other species, and some are found in North America. P. p.p., Love-wort (Pedicularis palustris), trau, or King Charles's Sceptre, is one of the principal ornaments of marshy grounds in the most northern countries of Europe. P. sylvatica is said to be astringent and serviceable in stopping hemorrhage; and applied externally it helps to cleanse ulcers.

Pedigree (possibly from pied de grue, crane's foot), from the slender lines used in drawing pedigrees), a tabular view of the members of a particular family, with the relations in which they stand to each other, accompanied or unaccompanied by a notice of the chief events in the life of each, with their dates, and the evidence of the facts stated. Pedigrees are indispensable aids to the student of history. The materials to be used in the formation of a pedigree are notes of the facts to be set forth, and a ready assistance of signs and abbrevi-
ations. These notes comprise the name of every person who is to appear in the pedigree, with such dates and circumstances as it may be considered desirable to record. Among the commonest abbrevi-
ations are: d., deceased; dwd., deceased; m.,母; w., wife of; s., son; d., daughter of; k., king; e., earl; &c. The sign = placed between:

PECOS PEDIIGREE

5
two names indicates that they were husband and wife; symbols indicate that they had children; \( \downarrow \) under a name signifies that the person had children. Men are frequently indicated by small squares, women by circles or lozenges. All persons of the same sex are arranged in their order of birth in two groups—the sons first, and then the daughters; but where the same father or mother has children by more than one marriage, the children of each marriage ought to form distinct groups. The actual arrangement, however, of a pedigree must always depend on the leading object which it is intended to illustrate. Specimens may be seen in the articles Bonaparte and Bourbon.

Tabular genealogies, generally brief, and meant to illustrate some particular family group of either a royal, public or private, of the early middle ages; but after the incorporation of the English Heralds' College far more attention was devoted to the compilation of pedigrees of families, more particularly with reference to their early heraldry and bravery. In the course of the 16th century the heralds obtained copies of all such accounts of the English families of any distinction as could be supplied to them, and entered them in the books which contain the records of their official proceedings. Royal commissions were issued till 1704 to the two provincial kings of arms, empowering them to visit in turn the several counties of England, in order to collect from the principal persons of each county an account of the changes which had taken place in their respective families in the interval since the last proceeding visitation, and to inquire what account could be given of themselves by families who had stepped into the rank of gentry, or had become settled in the county since that period. The register books kept by the heralds and their assistants contain the pedigrees collected in the course of the visitations, with the signatures of the heads of the families. See HERALDRY, Vol. V., p. 600.

In Scotland, in the absence of the regular system of the English heralds, the Scottish heralds, holding a great deal of evidence regarding the pedigrees of the historical families of the country scattered here and there in public and private collections, including the Advocates' Library and Lyon Office. A register of genealogies exists in the Lyon Office, in which the pedigrees of applicants, after being proved to the satisfaction of the heraldic authorities, are inserted with the accompanying evidence, and the Register of Arms contains much valuable information. To what extent the register of genealogies contains the pedigrees of the families of Scotland is not ascertained. The most probable document, conclusive of the facts which it sets forth, has not been ascertained by actual decision; but there can be no doubt that, in questions both as to property and honours, it would be regarded as the most important and authentic of proof.

See the works of Sir Bernard Burke (q. v.) and Sir Harris Nicolas (q. v.); Doyle, Official Baronage (1884); Forsyth, Peerage, Baronetage, and Knighthood (1881), and Collectanea Genealogica (1892); Marshall, The Genealogical Register (1879, 2d ed. 1883); Roberts, Calendrier Genealogique (1892); C. Burnett, Popular Genealogist, or the Art of Pedigree-making (Edin., 1865); Rye, Records and Record Searching (1888); Whitham, The Alphabetical Peerage (1853-56); Durrer, Bibliographia Genealogica Americana (1898).

Pediment, the triangular space over the portals at the ends of the roof of classical buildings. It may be called the gable of classical buildings, and is frequently enriched with sculpture, for which it forms a fine setting. See GREEK ARCHITECTURE.

Pedlers. See Hawkers.

Pedometer, an instrument for measuring walking. It has been used for centuries in the revolutions of the mechanism; and the mechanism is generally actuated by the relative movement of a comparatively heavy suspended mass attendant on each step, though in some forms it is driven by a cord connected with the foot. In all cases the walking movement is the number of steps rather than the distance walked; and the user must find the true meaning of the readings of the apparatus as applied to his own walking. An instrument attached to the wheel of a carriage so as to mark the number of revolutions of the wheel and so the distance traversed is called hodometer or odometer (Gr. ἡδος, 'way,' and μετρειν, 'measure'). This is usually a train of wheelwork attached to the axle of the carriage, and communicating motion to an index on a dial. A similar instrument, called a velocimeter, is attached to bicycles and tricycles. The name velocimeter is also applied to a wheeled apparatus, by surveyors, which records the distances in miles or rods.

Pedro I., emperor of Brazil (1798-1822), second son of John VI. of Portugal, fled to Brazil with his parents on Napoleon's invasion of Portugal, and became prince-regent of Brazil on his father's return to Portugal. For the proclamation of Brazilian independence and subsequent history, see BRAZIL. —Pedro II., his son, born 2d December 1825, became king in 1831 on his father's abdication, was declared of age in 1840, and, distinguished by his his kindness and leniency, ruled Brazil in peace until the sudden revolution of November 15, 1889, compelled him to withdraw to Europe, where he lived, mainly in France, Brazil becoming a republic under the name of United States of Brazil. He died at Paris, 5th December 1891. See Life by Moss (1892).

Pedro the Cruel, king of Castile and Leon, was the only legitimate son of Alfonso XI., and was born at Burgos, 30th August 1334. On his father's death (1350) Pedro succeeded to the throne without opposition, but left the whole exercise of power to his mother, Donna Maria of Portugal, and Albuquerque, his prince-minister and chamberlain. He reigned over Brazil in peace until the sudden revolution of November 15, 1889, compelled him to withdraw to Europe, where he lived, mainly in France, Brazil becoming a republic under the name of United States of Brazil. He died at Paris, 5th December 1891. See Life by Moss (1892).

Pedra, mountain range in Italy, forming the northern boundary of the Umbria region.
PEEL

people were in general well and justly governed, but the heavy taxes imposed to maintain the cost of his long wars with Aragon and Granada dissipated his popularity. Henry, who had fled to France, came back to Portugal, the Spanish boundaries, returned (1366) at the head of a body of exiles, backed by Bertrand du Guesclin (q.v.) with an army of mercenaries, and aided by Aragon, France, and the pope. Pedro, however, by great promises of territory and money, prevailed upon Edward, the prince black Prince, to suspend his extremity, and whilst Edward invaded Castile in the spring of 1367, totally defeated Henry and Du Guesclin at Navarrate (13th April), taking the latter prisoner. But the king disregusted his chivalrous ally by his cruelty to the vanquished, and paid no heed to his remonstrances; Edward accordingly repassed the Pyrenees, and left the misguided monarch to his fate. The whole kingdom groaned under his cruelties; rebellions broke out everywhere; and, in autumn 1367, Henry returned with 400 lances, the people immediately flocking to his standard. Pedro's scanty and ill-disciplined forces, including many Saracens, were routed at Montiel (14th March 1369), and himself compelled to retire for safety within the town, whence he was treacherously decoyed and captured by Du Guesclin. He was carried to Bayonne, and the two crowned monarchs, placed between him and Henry, in which Pedro was slain, 23rd March 1369. See Prosper Mérimée's monograph (1848; 2d ed. 1863; Eng. trans. 1849).

Peduncle. See FLOWER.

Peel, a county town of the Isle of Man, 111 miles by rail NW. of Douglas. On Peel Hill (450 feet) is a tower called Corrin's Folly; and on an island sheltering the harbour stand the beautiful ruins of Peel Castle, celebrated by both Scott and Wordsworth. It dates from the 12th century, but was mainly rebuilt from a foundation by Sir Thomas peel, Bishop of Durham, on 5th February 1798, near Bury in Lancashire. His father, Sir Robert Peel (1750-1830), created a baronet in 1806, was a wealthy cotton-spinner, from whom he inherited a great fortune. He was educated at Harrow, and at Christ Church, Oxford, where he took a double first in 1808, and entered the House of Commons in 1809 as member for Cashel, adopting the strong Tory politics of his father. Peel was then prime-minister. Peel set quietly about the business-work of the House, feeling his way with that steady prudence and persevering diligence that were the conspicuous features of his character. In 1811 he was appointed Under-secretary for the Colonies; and from 1812 to 1818 he held the office of Secretary for Ireland. In this capacity he displayed a strong anti-Catholic spirit (whence the witty Irish gave him the nickname of Orange Peel) and was in constant fear of being attacked by O'Connell that even the cool and cautious Secretary was swung into sending the agitator a challenge. The police, however, prevented the duel from taking place. From 1818 till 1822 Peel remained in the office of foreign secretary, where he sat for the university of Oxford. He now began to acquire a reputation as a financier and economist, and in 1819 was appointed chairman of the Bank Committee, and moved the resolutions which led to the resumption of cash-payments. He was still as avers as ever to anything like religious or political reform. No member of the Liverpool-Castleleach cabinet could have been to appearance more respectable; he even vehemently defended the Peterloo massacre. But as he re-entered the ministry as Home Secretary, Peel's troubles, often considerable, on which Canning was considerably in advance of his brother-secretary; and when the former was called upon by the king, after the resignation of Lord Liverpool, to form a sort of Whig-Tory ministry, Peel, along with the Duke of Wellington and others, withdrew from office. Yet it is singularly characteristic of this most honest statesman that even when he succeeded (1827) his opinions were veering round to the liberal and generous view of the claims of Roman Catholics; and when the death of Canning, shortly after, led to the formation of the Wellington-Peel government, its great measure—actually introduced by 'Orange Peel' himself—was the ever-rememberable one for the 'relief' of the Roman Catholics (1829). As Home Secretary he also signified himself by a reorganisation of the police and by his famous Act (sometimes called 'Peelers' and 'Bobbies'), and by the introduction of several other important measures. Meanwhile, the university of Oxford had rejected his upstart representative, and chosen in his stead Sir Harry Inglis. And now came on the odious question of parliamentary reform, on which Peel firmly but temperately opposed. In 1830 the Wellington-Peel ministry fell, and was succeeded by a Whig ministry under Earl Grey, which, in 1832, carried the Reform Bill. Peel (now, by the
death of his father, Sir Robert Peel), when he saw that reform was inevitable, accepted defeat and its results with great equanimity. He shrank from anything like fanatical opposition to the measure, and contented himself with vindicating it scrupulously as an experiment in political per centre. After it was passed he became the leader of the 'Conservative' opposition; and, as we have said, accepting reform itself as a fait accompli and irresistible, he only sought by a keen and vigilant criticism of Whig measures to retard the (too rapid) strides of liberalism.

In 1833, when the first reformed parliament assembled, Peel took his seat as member for Tamworth, which he represented till the close of his life. On the retirement of the Melbourne ministry in November 1834 he accepted almost of prime minister, but could not succeed in giving stability to his administration; he was compelled again to give place to Viscount Melbourne in April 1835, and resumed his place as leader of the opposition. Peel's conduct in opposition was always eminently patriotic. The Whigs, who were being pressed on the one side by the new Radical party and the Anti-corn-law League, and on the other by O'Connell and the Irish repealers, gradually lost ground, and, being all but defeated in 1841 on a motion of want of confidence, dissolved parliament early in 1843. The Irish repealers were virtually a contest between Free Trade and Protection. Protection won; and, when the new parliament met, a vote of no confidence was carried by a majority of ninety-one.

The Conservative party, headed by Peel, now came into office. The great feature of the new government was the attitude it adopted on the corn-law question. The Whigs, while in office, and even after their expulsion, were bent upon a fixed but moderate duty on foreign corn; the Anti-corn-law League would bear of nothing short of an entire repeal, while Sir Robert was in favour of a modification of the sliding-scale of duty which had existed since 1828. He introduced and carried (1842), in spite of strong opposition, a measure based upon this principle. The deficit in the revenue, which had become a crying evil under the Melbourne administration, next engaged his attention, and led him to bring in a bill (1842) for the imposition of an 'income-tax' of 7d. in the pound, to be levied for three years. To alleviate the distress caused by the revolution of the general tariff, and other abolished or lowered the duties on several very important articles of commerce, such as drugs, dyewoods, cattle, sheep, pigs, salted meat, butter, eggs, cheese, and lamb. He also secured himself respite in the repression of the malcontents of Ireland. O'Connell (q.v.) was tried for conspiracy, and, though the judgment against him was set aside on appeal to the House of Lords, the influence of the ‘agitator’ was broken. The first half of 1845 was marked by the alleged Maynooth being increased and changed into a permanent endowment instead of an annual grant, and by the foundation of the Irish unsectarian colleges, and other important measures. But the potato-riot in Ireland during the autumn, followed by a frightful famine, rendered 'cons' necessary. If millions were not starved, Colenso and the others resounding under their exertions. Lord John Russell announced the views of the Whig party on the crisis, and Peel again yielded. He told his ministerial colleagues that the issue was now decided, and that their repeal was inevitable. Some of them refused to go along with him, he resigned, but after a few days was recalled, and resumed office. Lord Stanley (afterwards Earl of Derby) succeeded, and, with Lord George Bentinck, Darnall (whose savage attacks goaded Peel into sending him a challenge), and others, formed a 'no-surrender' Tory party; but the Duke of Wellington, Graham, Abercrombie, and other eminent Conservatives stood by him, and the measure for the repeal was carried. He was, however, overthrown in the autumn and retired from office in June 1846, giving place to a Whig administration under Lord John Russell, to which he gave an independent but general support as the leader of a middle party rather Whig than Tory. In the critical months of 1844-45 he was one of the most important props of the government, whose free-trade principles he had now completely accepted. His ecclesiastical policy had also undergone a remarkable change, and he now frankly supported the Whigs in the efforts to carry an act for the repeal of the Jewish disabilities. He was himself regarded by the working and middle classes generally with much grateful respect. He had a keen English interest in sport, and a cultivated taste in matters literary and artistic. An accident put an end to his career. On the 28th of June 1844 he was riding with some friends near Lord Palmerston in the Don Pacifico matter; but on the following day he was thrown from his horse near Hyde Park Corner, and was so much injured that he died on the night of the 2d of July. He was buried in the church of Drayton Bassett, his Staffordshire home.

See Sir Robert Peel from his Private Papers, edited by C. S. Parker (3 vols. 1891-99), his Memoirs (2 vols. 1857), his Speeches (5 vols. 1856 and 1853); monographs on Peel by Guizot (1851), Laurence Peel, Lord Haldane, Baring, F. C. W. Smith, (1888), John McCarthy (1891), J. R. Southwood (1891), Shaw Levete, Peel and O'Connell (1887); Greville's Memoirs; Beaconsfield's Bentinck; Morley's Cobden; Froude's Beaconsfield (1890); Croker's Memoirs, Diaries, and Correspondence (1884); also Corn Laws, Catholic Emancipation.

Peel left five sons, the eldest of whom, Sir Robert, and the second, Sir Frederick, have both held office as ministers; whilst Arthur Wellesley, the youngest (born 1829), became Speaker of the House of Commons.

Peel, or Peel-tower, the name given to fortified towers or small castles of the type common on the Scottish border. In the 13th and 14th centuries the word 'peel' was used to denote the earthen works, surmounted by palisades, which surrounded and defended the courtyard and tower; but later on the name was applied to the tower itself. See Borders, Castle.

Peele, George, an Elizabethan dramatist, was son of James Peele, Clerk of Christ's Hospital, and was born most probably about 1558. He had his education there, and went up to Oxford in 1571. Next year his name is found on the list of members of Broughton Hall, now Lambrook College, and from December 1574 to 1579 he was a student of Christ Church. He took his bachelor's degree in 1577, his master's in 1579. He seems to have had a reputation at the university as a poet and raconteur; in his satirical pages, but by 1581 he had removed to London, where he lived a roystering Bohemian life as actor, poet, and playwright, dying a disreputable death in 1598. 'As Amerson died by the pot, so George Peele by the pan,' writes Meres. We know that he married in 1588, and was very near to those warned to repentance by the miserable Grocas in Grapesworth of Wit bought with a Million of Repentance (1592). Little confidence need be put in The Merry Jests of George Peele (1607), which are
PEEP O' DAY BOYS

mostly ancient and borrowed witticisms, representing Peele as a shifty and disreputable trickster and vagabond haunter of taverns. His best work, The Arraignment of Paris, a dramatic pastoral containing the revised version of the sonnets of Elizabeth, was published anonymously in 1584. Another pastoral play, The Hunting of Cupid (1591), is lost. In 1585 he was employed to write the Lord Mayor Dixi's Pageant, and in 1591 he prepared another for the mayoralty of Sir Willy, which is in Sir Henry Jortin's revised text to Sir John Norris in his expedition to Portugal in 1599 (cked out by A Tale of Troy); his Elegies Gravulatatory (1589) to the Earl of Essex on his return; his Polyphonica (1600), on the retirement of Sir Henry Lee from the office of queen's champion (closing with the exquisite song 'His golden locks time hath to silver turn'd,' quoted in The Newcomes); his Speeches for the reception of Queen Elizabeth on her visit (1591) to Burgsley at Theobalds; and his Honour of the Garter, written on the occasion of the investiture of the Earl of Northumberland and Worcester (1593), are other examples of the occasional poems that flowed from his fluent pen, and helped him to make a shifty living.

The historical play of Edward I. (1593) has descended in a very corrupt text, and is grievously marred by its baseless slanders against the stainless Queen Eleanor, due to the anti-Spanish prejudice of the time. His bombastic and ranting play, The Battle of Alcæus, was published anonymously in 1594, and was followed by another now lost, which is in Sir Henry Jortin's revised text to Sir John Norris in his expedition to Portugal in 1599.

In the reign of Elizabeth, he visited the Dutch Republic, and wrote a dramatic poem in imitation of Polyphonica (1600), on the retirement of Sir Henry Lee from the office of queen's champion (closing with the exquisite song 'His golden locks time hath to silver turn'd,' quoted in The Newcomes); his Speeches for the reception of Queen Elizabeth on her visit (1591) to Burgsley at Theobalds; and his Honour of the Garter, written on the occasion of the investiture of the Earl of Northumberland and Worcester (1593), are other examples of the occasional poems that flowed from his fluent pen, and helped him to make a shifty living.

The historical play of Edward I. (1593) has descended in a very corrupt text, and is grievously marred by its baseless slanders against the stainless Queen Eleanor, due to the anti-Spanish prejudice of the time. His bombastic and ranting play, The Battle of Alcæus, was published anonymously in 1594, and was followed by another now lost, which is in Sir Henry Jortin's revised text to Sir John Norris in his expedition to Portugal in 1599. His charming play, The Old Wives' Tale (1596), which most probably gave Milton the subject for his Comus, is well defended by Mr Bulwen from the groundless criticisms of Symonds and Saintsbury. The latter, however, finds much higher poetic merit in David and Bethsabe (1599) than either Mr Bulwen or Charles Lamb. The last work assigned to Peele is Sir Clymene and Sir Chemence (1599), but its authorship is more than doubtful.

Peele's works were first collected by Dyce (2 vols. 1838; 2d ed. 1839; a supplementary 3d volume in 1839). A carefully revised re-issue was published, together with Greene, in 1885, and a revised edition is that of H. H. Bulwen (2 vols. 1888). See Ward's English Dramatic Literature (1875), and J. A. Symonds's Shakespeare's Predecessors (1884).

PEEP O' DAY BOYS, an Ulster Protestant association (1780-95).

PEEPUL, or PIPAL (Ficus religiosa), also known as the SACRED FIG of India, and in Ceylon called the BO-TREE, a species of Fig (q.v.), somewhat resembling the Banyan, but the branches not rooting like those of that tree, and the leaves heart-shaped with long attenuated points. The tree is held sacred by the Hindus, because Vishnu is said to have been born under it. It is generally planted near temples, and religious duties spend their lives under its shade. It is also held sacred by the Buddhists of Ceylon (see BO-TREE). It attains a great size and age. The peepul is often planted near houses, and by the sides of walks, for the sake of its grateful shade. The juice contains a kind of gum, and is used by women and bandoline. Loc-insects feed upon this tree, and much lac is obtained from it. The fruit is not much larger than a grape, and although edible is not valued.

Peeage. See Nobility, Parliament.

Peevit. See Lapwing.

PEGASUS, in Greek Mythology, a winged horse which arose with Chrysoroi from the blood of the Gorgon Medusa, when she was slain by Perseus. He is said to have received his name because he first made his appearance beside the springs (pégaí) of Oceanus. He afterwards ascended to heaven to carry the thunder and lightning of Zeus. Some later authors make him the horse of Eos. Bellerophon had in vain sought to catch Pegasus for his combat with the Chimaira, but at length was advised by the seer Polydorus of Corinth to sleep in the temple of Minerva. The goddess appeared to him in his sleep, and gave him a golden bridle with which he caught him, and by his aid overcame the Chimaira. Modern writers ignorant of mythology make Pegasus the horse of the Muses, with whom, however, he had nothing to do beyond having by a kick of his hoof made spring up the inspiring fountain of Hippocrene.

Pegmatite, a variety of Granite (q.v.).

PEGU, a town, division, and river of Lower Burma. The town stands on the river Pegu, 46 miles N.E. of Rangoon. The old city was founded in 573 and was made the capital of a powerful independent kingdom. European travellers in the 16th century speak of its great size and magnificence. It was destroyed in the middle of the 18th century by Alompra; but was rebuilt. A celebrated pagoda still stands within part of the old walls. The place was handed over to the British by the inhabitants both in the first and the second Burmese war. Pop. 10,762. - The division has an area of 9160 sq. m. and a pop. (1891) of 1,456,489. - The river rises in the Pegu Yoma Mountains, and flows generally south for 180 miles, joining the Rangoon or Hingin River.

PELEHLY, an ancient West-Indian (Median and Persian) idiom, in use chiefly during the period of the Sassanides (235-640 A.D.). See Persia, Zend.

PELI-NO, a river of China, rises near the borders of Mongolia, flows north-east and south-east, past Peking and Tsien-tsin, and falls into the Gulf of Pe-chi-li after a course of more than 350 miles. The mouth of the river is defended by the powerful forts of Taku (q.v.). See China.

PÉNÉLOPE. See Peire, Pénélope.

PÉNÉLOPE, in Greek Mythology, a winged horse which arose with Chrysoroi from the blood of the
prevailed, which had no sanction from the law, of
the effect of tying the thumbs tightly together with
whipcord, that the pain might induce the offender to plead. Among instances of
the infliction of the pume forte et dure are the following: Juliana Quick, in 1442, charged
with her husband in speaking contemptuously of Her
Majority, 'the master of York', in 1588, for her constancy to the Catholic faith; Walter
Calverly of Calverly, in Yorkshire, arraigned at the
York assizes in 1665, for murdering his two children
and stabbing his wife; and Major Strangways, in
Northumberland in 1757, for refusing to hold when charged
with the murder of his brother-in-law. In 1720
a person of the name of Phillips was pressed in New-
gate for a considerable time, till he was released
on his submission; and the same is recorded in the
following year of one Nathaniel Hawes, who lay
under a weight of 250 lb. for seven minutes. As late
as 1741 a person is said to have been pressed to death
at the Cambridge assizes, the tying of his thumbs
having been first tried without effect. A statute
of 1772 virtually abolished the pume forte et dure, but
preserved that any person who shall stand mute
when arraigned for felony or piracy shall be con-
victed, and have the same judgment and execution
awarded against him as if he had been convicted
by verdict or confession. A later statute (1828)
made standing mute equal to a plea of 'not
guilty.'

PEIPUS, LAKE, in the north-west of Russia,
lies between the government of St Petersburg
and the province of Livonia. On the south it is con-
ected with Lake Pakoff by a long, narrow channel,
the length of both lakes being 57 miles, the greatest
breadth about 30, the area 1356 sq. m., and the
depth from 14 to 40 ft. The waters, which
abound in fish, are carried to the Gulf of Finland
by the Narva. The shores are marshy and flat.

PELREE, BENJAMIN, mathematician, was born
at Salem, Massachusetts, 4th April 1800, and
studied at Harvard, where in 1823 he became pro-
fessor. In 1849 he became consulting astronomer
in the American Nautical Almanac; and from
1857 to 1874 he was superintendent of the Coast
Survey. In 1856-46 he issued an admirable series of
mathematical text-books, and he contributed to
various mathematical journals. His paper on
the discovery of Neptune (1848) attracted universal
attention; and his papers on the constitution of
Saturn's rings (1851-55) were equally remarkable.
His great Treatise on Analytic Mechanics appeared
in 1857; and he left his mark on various depart-
ments of mathematical and astronomical investiga-
tion. He died at Cambridge, 6th October 1889.

PELISHWA. See MAHRATTAS.

PEKANU or WOOD-SNOUT (Martes pennanti),
an American species of Marten (c. v.), the largest
of all the species, was formerly common in North
America from Alaska and the Slave Lake into the
central United States, but is now extinct in settled
districts. There seems to be nothing in its habits
to justify its common name of Fisher or Fisher
Marten; but hunters it is called the Wood
Fisher.

PEKIN, capital of Tzaytow county, Illinois, on
the Illinois River, 10 miles by rail S. of Peoria.
It has several foundries, flour-mills, distilleries,
and manufactories of organs, ploughs, wagons, &c.
(Pop. (1860) 8429).

PEKING, or, as now often pronounced, PEKI-
CHOW, Tientsin (on the Northern Capital), the capital of the
Chinese empire, is in 39° 54' 36" N. lat. and 116°
37' E. long. It is situated in a sandy plain, and
is surrounded by many gated walls, with suburbs
smaller than most other large cities in the country.
The visitor coming to it from Tien-tsin is not
prepared for his approach to it by villas and
mansions with their parks and gardens, such as
greet him in drawing near to the capitals of
the West. At a turn in the road the city bursts at
once on his view, standing up grand and grim,
complete in itself with its lofty walls, and
the loitering towers upon them. The city consists,
in fact, of two cities—the Inner and the Outer—known
also as the Manchu or Tartar and the Chinese,
the Northern and the Southern. They are separated
by a high wall common to them both, but properly
belonging to the former, and giving it the appear-
ance of nearly a square, on which the other partly
rests in the form of a rectangle, its southern and
northern walls longer than those of the square, but
the other two shorter. The walls of the Manchu
city average 50 feet in height, and are fully 60 feet
wide at the bottom and 40 at the top; the dimen-
sions of those of the Chinese city are less—30 feet
in height and 25 and 15 in width. Those of the
former measure 144 miles in circuit, including
its part of the cross-wall, and those of the Chinese
city 10. Not counting the cross-wall, the whole
circuit measures about 21 miles, including al-
together an area of nearly 26 sq. m. In all
Peking has sixteen gates. Over each is raised a
tower about 100 feet high, and of very imposing
appearance. All the gates of the Manchu city are

Guarded by semicircular arcades, enclosing a
yellow-tiled temple to Kwan Ti, a hero of our 21st
century, now honoured as the 'God of War.'

When a stranger has entered by a gate of the
Northern City, and rides or drives along the cross-
wall to its central gate, he is greatly impressed by
the magnificence of the walls and towers, and
readily believes Peking is the grandest city in the
world. Such was the feeling of the writer when he
entered it in 1873; after he had passed through the
gate, there stretched before him, as far as his
eye could reach, a street about 200 feet across,
lined with what seemed to be brilliant shops on
each side, with wide spaces for foot-passengers,
and between them a carriage-way, raised about
two feet, on which a constant stream of vehicles,
with horses, mules, camels, and donkeys,
was hurrying. But by-and-by this impression of
the magnificence of the city was displaced by another
of the dilapidation and decay, squalor and filth,
which everywhere obtruded themselves.

Peking is one of the most ancient cities of the
world. On the same site stood the metropolis of
the feudal state of Yin, whose history is traceable
back to the 12th century B.C. In our 10th and
12th centuries two Tartar tribes which attempted

Gateway at Peking.
to impose their sovereignty on the empire made the old metropolis of Yen their capital. The second, which had absorbed the other, fell before the invading Mongols in the 13th century, and Kublai, a grandson of Genghis Khan, enters the chronological line as sovereign of all China in 1280. He made Peking his capital, and there he was found by Marco Polo, who styles the buildings which had absorbed the old 'a vast and excellent city.' It is called the King Shan, loosely translated 'Prospect Hill,' and affords the finest view of the entire city. It is separated from the Forbidden City by a moat, which is crossed by more than one marble bridge. Among the people the common name for it is 'Coal Hill.' Their belief being that it was formed by stores of coal, deposited there by way of provision against a siege. The western portion of the 'August City' goes by the name of the Western Park. A principal attraction in it is an artificial lake more than a mile long, though not nearly so wide, the dam of which is the hills to the west of the city, which served also to supply the moat all round the walls. The lake is crossed by a marble bridge of nine arches, and in the proper season its surface is beautiful with the large, brilliant flowers of the lotus. At the south end of the park are the summer-house, the rock-work, the gardens, and the hall for the examination of military candidates, and at the opposite end the copper statue of Maitreya (the coming Buddha, 60 feet high, with one hundred arms), the temple of the Patent Rice, a temple dedicated to Yuan Fei (2500 B.C.), the discoverer of the uses of the silk-worm, with a plantation of mulberry-trees and a cocoanut-house near it. The empress annually comes here with her ladies to offer sacrifice to this Yuan Fei, to feed the silk-worms, and to unwind some of the cocoons, as an example to the women of the empire.

We now come to the General City. On either side of the avenue leading from the central gate of the cross-wall to the August City are the principal offices of the government—the Ministry of the Censorate. In the same neighbourhood are the observatory, the Provincial Hall for literary examinations, the Colonial Office, and the Han Lin Yuan, which we call the 'National Academy,' and to belong to which is the highest literary distinction in China. Its members are many and of various grades. All the literary work of the government may be said to pass through their hands.

In the north-eastern corner of the city is the Russian mission, and west from it the Yung Ho Kung, or Foreign Temple. It is a great lamastery, where more than a thousand Mongol and Tibetan monks dwell, and are provided for, while they study their religion under the rule of a Geogor, or 'living Buddha.' At the north-west end of the city is the enormous image of Maitreya, 70 feet high. A little farther to the west stands, amidst many cypress, the temple of Confucius, under the ancient name of Kwo-ta-tze Chien. In the lofty hall are the spirit-tablets of the sage and his most celebrated disciples and followers—nothing else. Close by these rises from a cireel of water the Pi Yang Kung, commonly called 'The Hall of the Classics,' from the most remarkable thing about it—182 pillared slabs of granite, reared up in two corridors, and having the text of all the classical books engraved on them, in thick, fine, and braille, formats.

In the western side of the city are the headquarters of the T'ie-tuh, or 'general-in-chief,' who has the control of the police and garrison of the city, and very much directs its civil administration. He resides between the same two temples of both conspicuous objects. Five great bells were cast in the Yung-lo period, early in the 16th century. One of them is here, another about 2 miles in a north-west direction from the city, in 'The Great Bell Temple.' It is indeed a monster, 14 feet high, 34 feet in circumference at the rim, and 9 inches thick, and is said to weigh 120,000
Peking. (See Bell.) It is covered, insidiously, with
myriads of Chinese characters, from *Hieh Hieh* and *Ling Yen*, two Buddhist sutras.

Going towards the south wall, we met great
structures on our way. One is the *Tien Muo*, or Temple of Heaven, where the
reigning emperor goes to worship the spirits of
nearly two hundred sovereigns, who ruled from
Pâ-hâ (at least 3000 years B.C.) to the present
dynasty, and with them are assailed
the spirits of the ablest and best of their
subjects. The temple, which, as an
example of stone industry to all his people,
contains a large structure reserved for
the emperor, his ministers, and court
officials. The usual Chinese plan is
adherent to, the hall and other open courts are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.

The Chinese or Outer City is very sparsely populated. Much of the ground is under
vigation, large tracts are wooded, green fields
though the chief and other open spaces are
covered with artificial lakes and tanks. Where it is
over, the streets are for the most part narrow,
and the people are busy and hustling. There
are clubs-houses not a few, various temples,
charitable institutions for the poor, the aged, a
few hospitals, in the Inner City; companion
sung the latter is the new Roman Catholic church,
a magnificent structure, completed in 1891.
miserable. The manufacturers are unimportant. The government of the city is distinct from that of the department, and is administered by a superintendent (a high imperial functionary), a mayor, and officers in the several quarters. The police force in the city is very small; some 10,000 soldiers or militia are quartered in the town. The daily Peking Gazette, a pamphlet of sixty to seventy pages, is the imperial official journal. Since 1864 there has been an imperial university with American and European professors.

In the city of Peking, according to some, in the surrounding country; indeed, it exists only in some provinces, four or five in number. The dead-carr is in connection with the founding hospitals, which are established in the Inner and Outer Cities; there take their lives. At present the people are not aware of the existence of infanticide, nor is this abominable custom known in the surrounding country; indeed, it exists only in some provinces, four or five in number. The deaded-cart is in connection with the founding hospitals.

See Rennie's *Peking and the Pekingese* (1865); William's *Journeys in North China*, especially chapter xvi, which the author's brother, Mr. William, translated into Chinese: their Education, Philosophy, and Letters (1881); William's *The Middle Kingdom* (revised ed., 1883); and other works cited under CHINA.

**Pelagius,** a celebrated heresiarcl of the 5th century. He was probably born about the middle of the century in Britain, or according to some, in Avignon, his name being supposed to be a Greek rendering (Pelagios) of the Celtic appellative Morgan ('sea-born'). He was a monk, but he never entered into holy orders. He settled in Rome about 400, where he seems to have been acquainted with the Roman emperors and with their discussions. His views seem to have been early developed; and during his stay in Rome he seems to have given them full expression—especially in his commentaries on the Pauline Epistles, which were published at this time. It has been remarked that his doctrinal tenets, and in a word, his entire mind and views concerning the nature and end of the Eastem Church, and may therefore be taken as showing that Eastern influences were still alive in the Western churches. But more probably his theology was the outcome of his own devout and earnest mind. Jerome and Augustin tell tales to his discredit; but these are refuted by the respect with which Augustin always speaks of his character and conduct. The controversy about Pelagianism was not started by Pelagius, but by a devoted disciple of his. In Rome he had attacked to his views a follower of great energy named Celestius, probably an Irish Scot, originally a lawyer, who was practising in Rome when Pelagius came thither. He became a monk, and accompanied Pelagius wherever he went. In 410, after the sack of the city by the Gothic king, he went to Andrew. After some time Pelagius made a pilgrimage to Jerusalem, where he met St Jerome. Celestius having remained at Carthage, and sought to be admitted to ordination, his doctrines became the subject of discussion, and in a word, several opinions ascribed to him were condemned—proceedings which introduced St Augustine into the controversy. Meanwhile Pelagius remained at Jerusalem, and news of the proceedings at Carthage having been carried to Palestine, in 415 he was accused of heresy before the Synod of Constantinople. As accused by Celestius, his doctrines seem to have been a reaction against Gnosticism, Manicheism, and Fationalism, in the interest as he conceived of a higher morality than
the Augustinian writings in opposition to Pelagians, were some monks of the southern provinces of Gaul, and especially of Marseilles, whence they are usually supposed to have been, the Lutianian, from the Latin name (Molina) of that city. Of these leaders the chief was a priest named Cassian (Joannes Cassianus), who had been a deacon at Constantinople. Of the system which he propounded it may be enough to say that it upheld the sufficiency of grace as natural, but regarded the first act of conversion to God and the initial act of man's repentance for sin. Every man naturally possesses the capacity of beginning the work of self-conversion; but for all ulterior acts, as well as for the completion of justification, grace is indispensable. The Semi-Pelagian doctrine is often confounded with that of the Molinist (see Molina) school of Roman Catholic theology; but there is one essential difference. The latter persistently maintain the necessity of grace for all supernatural acts, even for the beginning of conversion, although they are generally represented as agreeing with the Semi-Pelagians as to the mode of explaining the freedom of the human will acting under the influence of divine grace. The chief writers in the controversy were Prosper, Bishop of Aquitania, and Ambrose of Milan, against whom is referred Celestine, Bishop of Rome in 431. It continued, however, to be agitated in the West for a considerable time. Faustinus, Bishop of Reji (Riez in the Baess Alps), towards the end of the 5th century revived the error, and it was emuluated in a council held at Cambrai in 553, and again in the second council held at Arusino (Orange) in 555, and again in the third council of Valence in 530. The words of Augustine were formally accepted: but the tendency which produced Pelagianism and Semi-Pelagianism has often reappeared. 

Pelargonium, a genus of plants of the natural order Geraniaceae, including many of the most favourite greenhouse flowers, to which the old generic name Geranium is often popularly given. The characters which distinguish pelargonium from geranium, as now restricted by botanists, are given in the article GERANIUM. Their leaves are numerous and mostly native of the Cape of Good Hope, of certain other parts of South Africa, and a few are natives of the Canary Islands. Some of them are herbaceous and some are stemless; most of them are half-shrubby. Some have tuberous root-stocks. The leaves exhibit great variety in form, size, colour, &c. The flowers always adhere to a certain type in form, but with great variety in size, colour, &c.; they are always in stalked umbels, which arise from the axils of the leaves, or on the stems. The kinds from the midst of the leaves. In no genus have the species produced more striking results than in this: and the number of beautiful hybrids and varieties is very great, some of them excelling in beauty any of the original species. Some species not possessing much beauty have been cultivated for the graceful colour of their leaves, which in some resemble that of roses, in others that of apples, lemons, &c. whilst that of many species is rather unpleasant. The cultivation of pelargoniums is similar to that of other Geraniaceae (see GERANIUM). A few of the species require the open air in the south of England; many are planted out in summer even in Scotland. Water must be liberally supplied to pelargoniums during the time of flowering; but no plants more strongly require a period of rest, and water must then be very sparingly given. The shrubby and sub-shrubby kinds are easily increased by cuttings either of the branches or the roots, stout year or the following year after the leaves fit for the purpose. Sandy soil and very moderate supplies of water are requisite till the cuttings are rooted, when richer soil and a more liberal supply of water are needed. The tuberculous-rooted species are increased by cuttings of the roots and by seed.

Pelagians, a term somewhat variously used for certain inhabitants of ancient Greece. In Homer the Pelasgi seem to have been an important tribe living in Thessaly. Herodotus seems to regard the Pelasgi not as Hellenic, but as barbarians who had occupied the Assinian plains at the time of it ere the Hellenes came thither (see Greece, Vol. V. p. 386). Modern students have also interpreted the term differently. Some regard the Pelasgi as the pre-Aryan occupants of Greece, others as the Greek-Italians—i.e. the common ancestors of the Greeks and Italians. The truth is that we know little or nothing of the pre-Aryan occupants of Greece, or of the Gravo-Italians, or of the builders of Cyclopean works, and that there are no reasons for identifying any of them with the insignificant tribe of Pelasgi. Then, Cyclopetan—i.e. a name applied to certain architectural works in Greece, which probably date from between 1000 B.C., and which are unconnected in point of evolution with any style of Greek architecture subsequently developed. The characteristic which distinguishes Cyclopetan from other works of architecture is that it consists of huge polygonal stones, which may or may not be so arranged as to fit into one another without interstices requiring lesser stones to fill them up, but which are always hewn and are always kept in their places not by means of mortar or any other material, but by their own great weight. On the other hand, work of this kind is not necessarily ancient; other considerations than the nature of the work itself are requisite to date it. Nor is it confined to Greece: similar remains are to be found in Egypt, Asia Minor, Sicily, Sardinia, Spain, &c., as well as in Greece and Italy. The most important ancient Cyclopean works in Greece are the walls of Tyrins, Iphippos, and Mycenae, the Lion Gate and so-called Tresorium (graves) of the latter place, and a probable temple on Mount Oetica. The Cyclopetan walls of ancient cities were so thick as to allow galleries to be run lengthwise through them. At Tyrins window-like openings look down from these galleries on to the town. That these galleries served the purposes of fortification in some way is clear, but in what way is not clear. The walls are broken by gates, of which the best known is the celebrated Lion Gate at Mycenae. In this form of doorway, in order to relieve the pressure on the lintel (which rests horizontally on the perpendicular stone doorposts), a triangular space is left above the lintel, and this is the case of the Lion Gate, with a slab, on which are sculptured the figures of two animals (not lions) rampant, one on either side of a pillar. This quadrilateral device is undoubtedly of oriental origin, or imitated from some Asiatic source, nothing as to the origin of the architecture or its builders. The same means for relieving the pressure on the lintel is employed in ancient remains in Cornwall. The Treasuries or tombs are underground chambers in the shape of bee-hives, vaulted with a succession of overlapping stones, and approached by a narrow passage through the side of the hill in which they are situated. The interior was ornamented with plates of bronze attached to the masonry. The term Cyclopetan was applied by the Greeks to this kind of architecture on the strength of the popular
etymology of the term: *cyclopes* = builders of a 'eye', or ring-wall. See CYCLOPES.

**Pelavo**, said to have been the first Christian king of Spain, seems to have made head against the Arabs in Asturias (q.v.) in the 8th century. See SPAIN.

**Pelcsch**, a royal castle of Roumania, built by Doderer of Vienna in 1783-84, in a romantic situation on the south side of the Transylvanian Alps, 70 miles N. of Bucharest.

**Pelew Islands**, also PALAU, a group in the Pacific belonging to Germany, lie south-east of the Philippines, at the western extremity of the Caroline Archipelago, with which they are sometimes classed. There are about twenty-five islands, mountainous, wooded, and surrounded with coral-reefs. Total area, 170 sq. m. The principal is Babelthup or Babeltop. The soil is rich and fertile, and the climate healthy. Bread-fruit, cocoa-nuts, sugar-cane, palms, areca-nuts, yams, &c. are grown. Turtles, tarpang, and fish abound on the coasts. The population is about 20,000 in all. The Plague is prevalent among the Malay race. The men go entirely naked and the women nearly so. They are described as being good-natured, and have peculiar social institutions — the women too. The islands were discovered by the Spanish in 1543, and visited again in 1696. See **Palau**, **Die Palauinseln** (1873); **Kubary, Die sozialen Einrichtungen der Palauer** (1885); and **Marche, Luçon et Palouan** (Paris, 1887).

**Pelham**, the family of, takes its name from a castle and lordship in the north-east of Hereford, and was elevated to the peerage in the person of Sir Thomas Pelham, who in 1706 was created Baron Pelham by William and Mary, and married Lady Grace Holles, sister of the Earl of Clare. His successor, THOMAS PELHAM HOLLES, Duke of Newcastle, and minister of the first two Georges, was born in 1693, and educated at Westminster and Clare Hall, Cambridge. In 1711 he succeeded to the vast estates of his maternal uncle the Duke of Newcastle, and next year to the peerage of his father, the first Lord Pelham. George I. rewarded his services by creating him Earl of Clare (1714) and Duke of Newcastle in Northumberland (1715). He was married twice, first to Elizabeth, Countess of Strathmore and Nottageham, and a Knight of the Garter in 1718, and in the same year he married Lady Henrietta Godolphin, granddaughter of the great Marlborough. In 1724 he succeeded Carteret as Secretary of State, and held the office continuously under all his successors for nearly thirty years, although a man of no particular ability except in parliamentary tactics. In 1754 he succeeded his brother, Henry Pelham, as premier, but retired in November 1756 to give place to the Duke of Devonshire, himself being rewarded with the title of Duke of Newcastle-under-Lyne, with special remainder to the Earl of Lincoln, his niece's husband. In July 1757 he was again premier, and compelled to take the first William Pitt into his ministry and to give him the lead in the House of Commons, and the supreme direction of the war and of foreign affairs. A succession of brilliant victories followed—Newcastle being only nominal head of the administration—and the great commoner had almost brought the war to a successful termination, when the accession of George III. led to the ministry's downfall. He resigned before the rent of Newcastle, in May 1762, by Lord Bute, as head of the ministry. Newcastle declined a preferred pension, with the remark that if he could no longer serve he would not burden his country. In the Rockingham ministry, formed this time for the purpose of toppling the ministry of Privy Seal. He died in Augt. 1768. — His younger brother, HENRY PELHAM (1690-1754), took an active part in supporting the rebellion of 1715, became Secretary of State for War in 1724, and was a zealous supporter of Walpole. In 1743 he was made head of a ministry as First Commissioner of the Treasury and Chancellor of the Exchequer. Events during his ministry were the war of the Austrian succession, the Dutch Rebellions of 1747 and 1756, and the successful financial bill of 1750 (see GEORGE II.), the reform of the calendar, and Lord Hardwick's Marriage Act. His father's ducal title descended to Henry, ninth Earl of Lincoln, whose great-grandson...

**Henry Pelham-Clinton**, fifth Duke of Newcastle, and twelfth Earl of Lincoln, was born 22d May 1811, and educated at Christ Church, Oxford. He represented South Notts in parliament from 1832 to 1846, when he was ousted by the influence of his father, the fourth duke, for supporting Sir Robert Peel in his free-trade measures. He was a Lord of the Treasury in the brief Conservative administration of 1834-35, and First Commissioner of Woods and Forests in the Peel administration, 1841-46. He was then made Irish Secretary, but went out of office with his father a few months afterwards. He succeeded to the dukedom in 1851, and returned to office in 1852, filling the post of Secretary of State for the Colonies in the Aberdeen government. The war with Russia broke out, and in June 1915 he formed a ministry to create a Secretary of State for War, and the new office was assigned to Newcastle. The terrible sufferings of the British army before Sebastopol in the winter months of 1854 raised a storm of popular discontent, and when the House of Commons determined to inquire into the conduct of the war the duke resigned. Newcastle was Colonial Secretary in the second administration of Lord Palmerston, and held the seals with general approval from 1859 till his death, 18th October 1864.

**Pelican** (*Pelecanus*), a genus of birds comprising a family, Pelicanidae, having a very long, large, flattened bill, and the mandible terminated by a strong hook, which curves over the tip of the lower one; beneath the lower mandible a great pouch of naked skin is appended; the tongue is very short, and almost rudimentary; the face and throat are naked, and the bird has a long length, the tail rounded. The species are widely distributed, frequenting the shores of the sea, lakes, and rivers, and feeding chiefly on fish. Although birds of powerful wing, they are seldom seen at a great distance from land. All of them are birds of large size. They take their prey by lowering over the water, and plunging upon it when it appears. They often fly in large flocks, and the sudden sweep of a flock of pelicans at a shoal of fish is a striking and beautiful sight. They store up their prey in their pouch, from which they bring it out as leisure, either for their own eating or to feed their young. The pouch is capable of being wrinkled up into small size, and of being greatly distended. The Common Pelican (*P. onocrotalus*) is as large as a swan, white, slightly tinged with flesh colour, and, in old birds, grey, with red bills, where the bill feathers are black, but are scarcely seen except when the wings are expanded. It is a native of the eastern parts of Europe and of many parts of Asia and Africa, and frequents both the seacoast and also rivers and lakes. It makes a nest of grass on the ground, and lays six or seven white eggs, often on an island, and lays two or three white eggs. The parents are said to carry water to their young, as well as food, in their pouch. During the night the pelican sits with its bill resting on its breast. The rail or hook which extends from the bill is red; and it has been supposed that the failure of the pelican feeding its young with blood from its own breast originated in its habit of pressing the
hill upon the breast in order to make it easier to empty the pouch, when the red tip might be mistaken for blood. Another explanation is that the characteristic has been transferred to the pelican from the flamingo, which does discharge into the mouth of its young a bloody-looking secretion which it discharges (see Notes and Queries, 1862, p. 361). And long since Sir Thomas Browne in *Vulgar Errors* pointed out that the carvings

is so enormous. The fish probably engulfs small animals in whale-like fashion, but at the bottom of the sea instead of at the surface. Gill and Ryder discovered a similar form, *Gastrostomus bairdii*, in 1883, in which the month again suggests a pelican's pouch. The equally strange Saccopharyngide are perhaps allied, but the jaws are less enormous, and the animals are notable for swallowing fishes larger than themselves.

**Pelican**

The ancient name of a wooded mountain-range in Thessaly, extending along the east coast. According to the myth, the Titans, in order to seal Olympus, the abode of the gods, placed Ossa (q.v.) on the summit of Pelion, the highest peak (6,210 feet) of the range. Its sides and summit have always been clothed with forests of oak, chestnut, beech, elm, plane, and pine; it was of Pelion timber that the Argo (see *Argonauts*) was built. The Centaur Chiron had his home on this mountain.

**Péllisson**, Amable Jean Jacques, Duc de Malakoff, Marshal of France, was born 6th November 1794, at Maromme, near Rouen, and, having passed successfully through the colleges of La Fère and St Cyr, entered the army. He served on the staff in Spain in 1823, made the campaign of the Morea in 1828, joined the first expedition to Algeria in 1830 as major of cavalry, and in 1838, with Algeria with the rank of lieutenant-colonel. In 1845 he acquired an unenviable notoriety by slaughtering more than 500 Arabs who took refuge in caves in the Dabra. By 1850 he had attained the rank of General of Division. On the outbreak of the Crimean war in 1855 he was given the command of the first corps, and soon succeeded Marshal Canrobert in the chief command before Sebastopol. On 8th September he stormed the Malakoff, the key of Sebastopol, for which exploit he was rewarded with a marshal's baton, and on his return to France was created Duc de Malakoff and a senator, and received a grant of 100,000 francs. In 1858 he came to London as the French ambassador, but resigned his post in the following year, and was named governor of Algeria, where he died on 22d May 1864. See Sir E. Hanley, *The War in the Crimea* (1869).

**Pelite Structure**, in Geology, applied to rocks which have a texture like that of dried mud.

**Pella**, the ancient capital of Macedonia, and the birthplace of Philip II. And Alexander the Great, was situated in the midst of marshes, a few miles NW. of Thessalonica, which stood half-way between it and the head of what is now the Gulf of Saloniki. Its royal castle had wall-paintings by Zeuxis.

**Pellagra** (Ital. *pelle agrì*, 'rough skin'), a disease, unknown prior to the first half of the 18th century, which is common among the peasantry of Northern Italy, and occurs also among the working class in Corfu, Roumania, the Landes and Girond in France, and Oviedo and elsewhere in Spain. But the headquarters of the disease are in the northern and north central provinces of Italy; it is unknown to the south of Rome and in the islands. It is an error to describe pelagra as the result of poverty alone—to call it *il delirio della miseria*; it is clearly traceable to the use, as the staple diet, of damaged and unwholesome maize, gathered before it is ripe, and stored carelessly—often in cellars or pits—in its wet state. The disease makes its appearance in spring, in the form of a reddish-brown rash, which smarted painfully to the exposed sun and air, and then on the back and feet; towards autumn this disappears, leaving, however, hard, dry spots on the skin, and returning with increased determination in the

**Pelican** (*Pelecanus crispus*).

and plicature, ecclesiastical and heraldic, of the so-called pelican feeding its young with its own blood were by no means quite like a pelican, and noted that a like tale was told by the Egyptians of the vulture. The story, which was unknown to the classical writers, seems to have originated in Egypt; and the love of the vulture for its young was proverbial there (see *Academy*, 1884, p. 87). The Rufous-necked Pelican (*P. fusca*) abounds in the West Indies and in many parts of America. Other species are found in other parts of the world, and in some places the number of pelicans is prodigious, particularly in some of the most southern parts of the world. See also *Heraldry*, Vol. V. p. 694.

**Pelican-fish** (*Euphrarpex pelecanoides*), a remarkable deep-sea Teleostean fish, described by

Vaillant in 1822. The body is somewhat pelike, and is fringed on the dorsal and ventral middle line with spinous rays. It is the region of the jaws, however, which is most remarkable, the gape
following spring, and again in each successive year, till the skin becomes shrivelled and yellow, or black in certain spots, and the body is reduced to a mummified state. A burning feeling in the mouth and bowels is an accompanying symptom, and profuse diarrhoea, along with a rapid wasting, and dropsey, is a frequent cause of death. As the disease progresses, disorders relating to the nervous system gradually develop, and culminate in melancholy, imbecility, or mania; death often ensues from delirium, or the wretched patients drag out their life within the walls of an asylum. In România 1,2, and in Corfin 3-2 per 1000 of the population, have died from pellagra, and 3688 deaths from pellagra, or 2.04 per 1000 of the estimated population; but in 1881 the proportion was 4.8, and since then it has steadily decreased, in part owing to the number of hospitals built within late years for the special treatment of this disease. See the official report, La Pellagra in Italia (Rome, 1880).

Pelligrini, CARLO, caricaturist, was born at Capua in 1839, came to London in 1865, and from 1868 till his death on 22d January 1889 was the "Ape" of Vanity Fair, the delineator of its inimitable series of cartoons of celebrities. Especially good was his statute in red plaster of Mr Lowe standing on a match-box (1871).

Pell'ico, SILVIO, an Italian poet, celebrated for his long and cruel imprisonment by the Austrians, was born 24th June 1788, at Saluzzo, in Piedmont, and was educated in Pignerol, where his father, Onorato Pellico, a lyric poet, had a silk-factory. In his sixteenth year he accompanied his sister Rosina (on her marriage) to Lyons, where he remained until Foscolo's Sepolcri awakened in him a strong patriotic feeling and an irresistible desire to return to Italy. Coming, about 1810, to Milan, he was warmly received by Ugo Foscolo and Vincenzo Monti, and became French tutor in the military school. His tragedies of Laodamia and Frenesce da Rimini gained him an honourable name amongst Italian poets. He again translated Manfred of Byron, with whom he had become acquainted. He lived in great intimacy with the most eminent patriots and authors of liberal views, and took an active part in a periodical, Conciatitore, which after a time was suppressed on account of its liberal tone. In 1829 he was arrested on a charge of Carbonarian, and sent to the prison of Sta Margherita, and afterwards to the Piombi at Venice. After two years' imprisonment he was condemned to death, but had his sentence commuted to fifteen years' imprisonment, and was carried to the fortress of Spielberg near Brinn; he was, however, liberated in August 1830. During his imprisonment he had written two other dramas; and afterwards published an account of his sufferings during his ten years' imprisonment, under the title Le mie Prigioni (Paris, 1833), which has been translated into many languages, and has made his name familiar where it would not have been known on account of his poetry. Pellico's health was never quite restored. The Marchioness of Barolo received him into her house at Turin as her secretary. Pellico subsequently published numerous tragedies and other poems, and a little catechism on the duties of man. He died January 31, 1854. See the Life by Chiron (Italian, 1852), and that by Bourdon (Paris, 5th ed. 1885).

Pellitoric, or WALL-PELLITORIC (Parietaria), a genus of plants of the natural order Urticaceae, having both unsexual and hermaphrodite flowers on the same plant, the perianth of both kinds 4-fld. The Common Pellitory (P. officinalis), which grows on old walls and heaps of rubbish in Britain and many parts of Europe and Asia, is a perennial herb, with erect or prostrate stems, ovate leaves, and inconspicuous flowers. It sometimes attracts attention from the manner in which the pollen is conti- nually discharged in hot summer days by an elastic movement of the filaments. It is an old domestic remedy as a diuretic, emollient, and refrigerant, but only as a diuretic it is really serviceable, a property which depends on the nitre it contains.

Pellitory (Parietaria officinalis).
a third expedition was planned against Alexander of Phere, who, as usual, was threatening the Thessalian towns. The command was given to Pelopidas, and in the summer he marched into Thessaly, where he won the battle of Cynocephalae, but was himself killed while too eagerly pursuing the foe.

**Peloponnesus** (the isle of Pelopia), now called the Morea (q.v.), a peninsula which formed the southern part of ancient Greece, Helias Proper being situated to the northward of the isthmus on which stood the city of Corinth. See GREECE. The whole area is less than 9000 sq. m. Among its most important cities were Sparta and Argos. Sparta acquired after the Messenian war a decided supremacy over the other states, and disputed the supremacy with Athens in a war of almost thirty years' duration (451-404 B.C.)—the famous Peloponnesian war, of which the history has been written by Thucydides.

**Pelops**, in Greek Mythology, the grandson of Zeus, and the son of Tantalus, was slain by his father, and served up at an entertainment which he gave to the gods, in order to test their omniscience. They were not deceived, and would not touch the horrible food; but Demeter, absorbed with grief for the loss of her daughter, ate part of a shoulder without observing. The gods then commanded the members to be thrown into a cauldron, out of which Clotho brought the boy again alive, and the want of the shoulder was supplied by an ivory one. According to the legend most general in later times, Pelops was a Phrygian, who, being driven by Ilos from Sipylos, came with great treasures to the peninsula which derived from him the name of Peloponnesus. Having purchased some skins, he entered the temple of Pan at Delphi, and after the contest purchased the cauldron of the god with Pan's flames. Pelops then married Hippodamia, obtained his father's kingdom by conquering him in a chariot-race, and became the father of Atreus, Thyestes, and other sons. But in what appear to be the oldest traditions he is represented as a Greek, and not as a foreigner. He was said to have revived the Olympic games, and was particularly honoured at Olympia.

**Pel's Fish-owl** (Scotopelia peli), so named from having been first discovered by Mr Pel, the Dutch commandant at Elmina, is found in West Africa from Senegambia to Gaboon, and in the Zambezi region in South-east Africa. It measures about 19 inches in length; its wing is 18 inches long. Its colour above is a deep rufous-brown crossed with numerous irregular bars of black; the wing is similarly barred; the under surface of the body is light brown with heart-shaped bars of black; the bill is of a dark-blue lead colour, and the iris is dark brown. The birds from the Zambezi are a little larger than those from West Africa. The natives regard this owl as a fetish bird possessing the power of destroying whatever it looks on; and curiously enough its presence in more than one locality has been followed by an outbreak of disease among domestic animals. See the Ibis for 1859, p. 445.

**Pelletier Effect.** See Electricity, Vol. IV. p. 276.

**Peltry**, a general term applied to the trade in skins of wild animals, and to the skins themselves. It is understood to mean only skins undressed, except by drying, and eddy those which, when dressed, are called Fur. See FUR.

**Pelusium**, the Greek name of an ancient Egyptian city, situated at the north-eastern angle of the Delta, and important as the key of Egypt on the Asiatic side. The eastern mouth of the Nile derived from it the epithet Pelusiac. Its identity with Sin of the Old Testament and the Greek Sais is doubtful. The *Ostium Pelusiacum* was choked up with sand as long ago as the 1st century B.C., and the whole district is a wilderness of sand and marshes.

**Pelvis.** This term is used to indicate one of the chief divisions of the skeleton. It consists of the sacrum, coccyx, and the innominate or haunch bones. Each of the latter originally consisted of three parts—ilium, ischium, pubis—which have become fused together. By the articulation of the pubic bones in the middle line anteriorly the innominate bones form the anterior and lateral aspects of the pelvis. Wedged in between them posteriorly are the sacrum and coccyx. Various powerful ligaments give support to and maintain the pelvic bones in position. Notwithstanding the importance of this part of the skeleton, the ancient Greek physician had no word whereby to designate it, and both Greek and Roman associated the sacrum and coccyx with the vertebral column, and the innominate bones with the lower extremities.

The pelvis is divided into two parts by a plane which extends from the upper margin or promontory of the sacrum to the upper margin of the articulation between the two public bones—i.e. the symphysis pubis. On the inner surface of each innominate bone a line may be traced from the sacral promontory to the symphysis pubis. This is named the ilio-pelvic line, and it helps to complete the circumference of the plane which divides the pelvis into two parts. The space above this plane lies mostly between the expanded iliac bones. It belongs to the abdomen proper, and is named the false pelvis. The space below the level of the sacral promontory and ilio-pelvic lines is called the true pelvis, and certain descriptive terms are employed in connection with it. Thus the plane which separates it from the false pelvis is called the inlet or brim of the true pelvis. Its inferior circumference or outlet extends from the tip of the coccyx to the inferior border of the pubic symphysis, and from the one ischial tuberosity to the other. Between the ischial tuberosities in front and extending forwards to the symphysis there is the subpubic arch. The space between the inlet and the outlet is named the cavity of the true pelvis. The measurements of the true pelvis are made along certain definite lines which are applicable to the brim, the cavity, or the outlet. These are (1) the antero-posterior or conjugate diameter—i.e. from the mesial line in front to the mesial line behind; (2) the transverse or widest diameter; (3) the oblique diameters—right and left. These extend from the articulation between sacrum and ilium on one side to the farthest point on the opposite side of the mesial plane. In the erect attitude of the body the plane of the brim of the true pelvis forms.

![Fig. 1.—Adult Human Pelvis, in situ:](attachment:image)
an angle with the horizontal which varies from 60° to 65°. Thus the weight of the upper part of the body which is communicated to the sacrum is directed downwards and transmitted through the innominate bones to the heads of the femora, and so to the inferior extremities. In addition to the ligaments, muscles, blood-vessels, and nerves which constitute the soft parts of the pelvis there are certain special organs which are present in both sexes, and others which are peculiar to each sex.

Thus, of those common to both sexes, there are the urinary bladder and the rectum. The urinary bladder is placed behind the symphyseal pubis, and only rises out of the pelvis into the abdomen when considerably distended. The rectum—a name applied to that part of the alimentary canal which passes through the pelvis—is placed on the front of the sacrum and coecyx, a short distance below which it terminates in the anus. The lower end of the rectum is supported by two muscles—the levatores ani—which surround it so completely as to form a floor or diaphragm for the pelvis. In addition to these organs there are others which are characteristic of the sexes. In the male we have the retecula seminale and the prostate gland—the latter surrounding the outlet of the urinary bladder. In the female we have the uteri, ovaries, and their various appendages. The diverse functions of these organs have led to corresponding and marked differences in the size and form of the osseous pelves of the sexes. In the female the bones are more slender, and the muscular impressions less distinct. The true pelvis has a greater breadth and capacity, but its perpendicular depth is less. The inlet is more nearly circular; the ischial tuberosities are wider apart, and the subpubic arch is much wider. All of these differences indicate special modifications in connection with the necessities of child-bearing. Although the depth of the cavity of the true pelvis steadily increases from childhood to puberty, yet the characteristics of the sexes are discernible even at birth.

But not only does the pelvis display features which are characteristic of sex; it also presents characters which are peculiar to individual races of mankind. In this field of study a great amount of valuable work has been contributed by Sir William Turner of Edinburgh University, and embodied in the reports of the Challenger expedition. In determining these features peculiar to race numerous measurements have been made, mostly in relation to the cavity of the true pelvis, with its brim and inlet; but many of the external dimensions of the entire pelvis have also been noted, as well as the dimensions of individual bones. One of the most valuable of the external measurements is the comparison between the maximum height and breadth of the entire pelvis. A common result is obtained by the following formula:

\[
\text{height} \times \frac{100}{\text{breadth}},
\]

which establishes what is called a breadth-height index. Another index of great importance is the result of a comparison between the conjugate and transverse diameters at the brim of the pelvis. This is named the pelvis or brim index, and is obtained by the formula, \(\text{conj. diam.} \times 100\). The measurements are usually recorded in millimetres. As the result of numerous measurements Sir William Turner has devised a classification of pelvises based upon the relation of the conjugate and transverse diameters at the brim of the true pelvis—i.e. upon the brim index. Thus, those pelvises in which the conjugate diameter of the brim is either longer than the transverse or closely approaches it are named dolichopellic (pelvis, the Greek equivalent of the Latin pelvis, 'a basin'; and dolichos, 'long'), and in those the brim index is above 95. When the transverse diameter of the brim greatly exceeds the conjugate they are named platypellic (platys, 'while'), and the brim index is below 90. In those where the transverse diameter is not greatly in excess of the conjugate, i.e. where the brim index varies between 90 and 95, both inclusive, the term mesatipellic (mesaitatos, 'middlemost') is applied. Grouping the pelvises under these headings we find that such races as Australians, Bushmen, Hottentots, Kaffirs, Malays, Andaman Islanders, &c. are dolichopellic. Negroes, New Caledonians, &c. are mesatipellic. British, French, Germans, Europeans generally, natives of India, Chinese, American Indians, &c. are platypellic. These results are obtained from the examination of male pelvises, since, as we have already seen, the female pelvis is modified in its diameters in relation to the special requirements of sex.

If now we compare the human pelvis with that of the lower mammals, we shall find that the human pelvis is characterised by breadth and shallowness and the great capacity of the true pelvis. When, therefore, the conjugate diameter at the brim of the pelvis is longer than the transverse—i.e. when the pelvis is dolichopellic—an approach is made to the condition which prevails even to a greater extent among the lower animals, and it is 'a diminished or abnormal' disposition, as compared with platypellic pelvis of Europeans.

We have seen that in man the weight of the trunk is transmitted to the lower limbs through the pelvis, whereas in quadrupeds the downward pressure of the weight of the trunk is differently disposed. Doubtless, therefore, the attitude has great influence in controlling the expansion of the pelvis in the transverse diameter when the parts are young and plastic. It may therefore be owing to the habits and mode of life of the black races in their aboriginal state that their pelvis approach the lower type. Take, for example, the aboriginal Australian who sits on the ground embracing his knees with his arms, or any of the savages whose favourite attitude is 'squatting'—i.e. sitting down with the body bent forward and the buttocks resting on the heels; or again, when in pursuit of a game a stooping or crouching attitude is adopted. In all these positions the pressure upon the sacrum and pelvis is diminished, and there is a tendency to approximate the conditions to those of the anthropoid apes, while the white man on the other hand preserves the erect attitude whether standing, sitting, or walking.

Pemba, a coral island off the east coast of Africa, lies 50 miles N.E. of Zanzibar Island, has a length of 46 miles and a breadth of 43; area, 372 sq. m. There are numerous bays on the east coast; on one of them stands the chief town, Chaka. The inhabitants, 50,000 in number, rear cattle and trade in rice, cloves, and ebony, all products of the
Island. It is under the same administration as the rest of the Transvaal Protectorate.

Pembina: a city (pop. 1900, 929), capital of Pembina County, North Dakota, on the Red River of the North, at the month of the Pembina River. By rail it is 68 miles SW. of Winnipeg and 203 NW. of St Paul; and its position makes it worthy of notice, as on the north it marks the boundary line between Manitoba and the United States, while on the east only the Red River separates it from Minnesota.

Pembroke, the county town of Pembroke shire, on a navigable creek of Milford Haven, 9 miles W. of Tenby and 50 W. by N. of Cardiff. On the extremity of the peninsula on which this town is built stands Pembroke Castle, founded in 1094 by Arnulf de Montgomery, a very imposing ruin, with a Norman keep 75 feet high and 52 in diameter. Beneath is a huge natural cavern, 70 by 50 feet. The birthplace of Henry VII., this castle in 1483 was taken by Cromwell after six weeks' siege. Monkton Priory, with its rootless Decorated choir, is another interesting structure. The Pembroke district of boroughs, returning one member, comprises Pembroke, Milford, Tenby, Wiston, and also (since 1885) Haverfordwest, Fishguard, and Newgale. To form a great horned ram, which has given the title of earl to the House of Herbert (q.v.). At Pembroke Dock, or Pater, 21 miles north-west, is the naval dockyard and arsenal, established in 1314. It embraces an area of 70 acres, and since 1861 has been acquired at a cost of more than a quarter of a million. Pop. of Pembroke (1861) 15,071; (1881) 18,339; of Pembroke Dock (1861) 10,190; (1891) 10,481.

Pembroke shire, a maritime county of South Wales, the westernmost of the Principality. Measuring 30 by 25 miles, it has an area of 611 sq. m., or 391,181 acres, of which three-fourths is arable. The coast-line is much of it rugged and precipitous; and inland the surface is undulating, green hills alternating with fertile valleys, and containing a maximum altitude of 1754 feet in the Preseli range, which traverses the north of the county from east to west; and there are the Towy separating Pembroke shire from Cardigan, and the East and the West Cleidion. The rocks are largely Silurian; the soil varies much in quality; and coal, slate, lead, and iron have been worked. St David's Cathedral and half-a-dozen medieval castles make the county notable for its old inscriptions, neolithic implements, and Roman coins. At Haverfordwest and Tenby a colony of Flemings was established in 1107. They adopted the English tongue; and Pembroke shire, or 'Little England beyond Wales,' is now over more than half its area inhabited by an English-speaking population, although it is the remotest of all the Welsh counties. It was harried by Owen Glendower in 1406; and on 23rd February 1707 it witnessed the last French invasion, when 600 regulars and 800 gentry, with the Fishguard fleet, found it necessary to surrender unconditionally to some militia and yeomanry under Lord Cavendish. Pembroke returns one member. Pop. (1801) 50,280; (1841) 88,044; (1891) 91,824; (1911) 80,123. See Fenton's 'History of The County of Pembroke' (1814).

Penman: This was originally a North American Indian preparation only. It was introduced into the British navy victualling-yards in order to supply Arctic expeditions with an easily-preserved food, containing the largest amount of nutriment in the smallest space. As made by the Labradorians, a portion of the last remnant of vestiges dried in the sun, or wind, and then pounded into a paste and tightly pressed into cakes; sometimes a few fruits of Alnus alba varia are added to improve the flavour. It will keep for a very long time uninjured. That made for the arctic voyagers was chiefly of beef. In making pemmican it is necessary to remove the fat completely.

Pemphigus, or Pemphigus, belongs to that order of skin diseases which is characterised by an eruption of large vesicles, filled with serous fluid, and known as bullae. The disease occurs both in the acute and in the chronic form. In the acute case of acutepemphigus, bullae, or blisters, from the size of a pea to that of a chestnut, appear in succession (chiefly on the extremities), and having continued three or four days break, form a thin scab, and soon heal, unaccompanied with febrile or inflammatory symptoms. In England it is observed in cases of considerable constitutional disturbance, the bullae are larger, and the scabs heal with difficulty. The chronic form differs mainly from the acute by its prolonged continuance. The acute variety chiefly affects children, and has been ascribed to Cincinnati, errors of diet, &c.; while the chronic form chiefly attacks aged persons, and is probably due to debility and impaired nutrition. The acute form usually requires nothing but soothing medicines and diet, and mild local dressings, such as simple cerate, to protect the raw surfaces from exposure to the air. In severe cases of pemphigus bullae, with the judicious use of tonics (iron, bark, &c.), is most commonly successful. In obstinate cases arsenic is sometimes of use.

Pen, an instrument for writing with a fluid ink. When the Egyptians, Greeks, Romans, and some other ancient nations wrote upon papyrus or parchment they used a reed pen (Lat. calamus), and when in the Arab states the legend is covered with wax they wrote upon them with a pointed style of bronze, bone, or other material. Some of these ancient reed pens have been preserved. One, now at Naples, was found in a papyrus at Herculanum. Reed pens are still the only kind used by the natives of Persia and some neighbouring countries. A metal pen does not suit their mode of writing. These reed pens are pointed much in the same way as quills, and are made from the reeds or stems of Phragmites communis, which is also a good writing plant. Eremites and probably other species of this genus. The Chinese and Japanese write with a small brush or hair-pen. Quills are known to have been used for writing with as early as the 7th century of our era, but long after that reed pens also were employed in Europe for official purposes.

Metal pens were in use, but probably only to a very limited extent, among the ancient Romans. In the museum at Naples there is a bronze pen, milled like a modern steel pen, which was found at Pompeii. Another of a somewhat different shape was discovered at Herculanum. Bronze and silver writing pens appear to have been occasionally made in the middle ages, but there is little doubt these were more curiosities than articles in general use, and the same may be said of all metallic pens of a recent date, sometimes referred to in books, until we come to the beginning of the 19th century. For centuries before that quills were universally employed among western nations, and in schools steel pens were only very partially substituted for them till about 1840. Perhaps the most metallic pens of which we have any certain knowledge were some made in 1780 by Mr Harrison, split-ring maker, Birmingham, for Dr Priestley. They were of sheet-steel, formed into a tube and filed into shape, the joining of the metal making the slit. Brass pens were afterwards made in England before the end of last century; one of these seems to have been in the Strawberry Hill collection of art objects and
curiosities (Walpole's), which was sold in London in 1842. In the early part of the century various plans were tried to produce pens more lasting than ordinary quills. The quills were pointed with metal, but the new cutting sodal acid and paraffin shell had small pieces of diamond and other hard gems embedded in them by pressure. Another plan was to attach gold to their points. Such pens were of course too costly for general use. Barred pens of steel made by Mr Wise were on sale in London in 1808 but the carbonizing soda was so expensive that they did not take the market. The first English patent for the manufacture of steel pens is that of Bryan Donkin in 1803. A patent, the first of its kind in America, was granted in 1810 to Peregrie William-son of Baltimore for the manufacture of metallic pens. Steel pens of the barrel type were being made in 1815 by Sheldon of Sedgley, the price being 18s. per dozen. By 1820 the number of manufacturers had increased. To Mr James Perry belongs the credit of bringing steel pens into general use. He began pen-making at Manchester in 1819, using the best Sheffield steel (from Swedish charcoal iron) for the purpose. Perry removed to Red Lion Square, London, and had developed the pen trade with remarkable energy before the prominent Birmingham makers, Mitchell, Gillott, and Mason, ever came into existence. He originated the method of making pens. He took out a patent for a new method of making pens in 1830, from hard, thin, elastic metal, and a 'length of slitted or cleft space' scarcely exceeding that of quill-pens; and he made other improvements in 1832. The greatest improve-ment in the manufacturing side of the subject was the screw handpress for the cutting out of pens, enabling the manufacturer to supply them cheaply and in quantities. At first the method of slitting pens by means of a press was kept a profound secret by Gillott and Mason. To Mr John Mitchell, Birmingham, has been assigned priority in this invention. Sir Josiah Mason made barrel pens in 1828, and 'slip' pens for Perry in 1829. At the end of 1875, when Sir Josiah Mason retired from his business, his output exceeded 32,000 gross weekly. The output in 1866 had increased to 50,000 gross weekly; and about 4000 people were employed in all departments. In 1886 the weekly average of pens manufactured was about 160,000 gross, or twenty-two million pens. There were four pen-works in the United States at the same date, only one of which was of terrestrial origin, and one in Germany. The most successful recent patents in connection with pens have been those dealing with points which are turned up or turned down, thickened or 'plumished,' for smooth writing. A leading pen-maker has a catalogue containing 5000 varieties of pens, while it has been estimated that no fewer than 100,000 different shapes and sizes are in the market. All the pen-makers now make pen-holders, and Josiah Mason has related that he made the first stick pen-holders for Perry in 1832, and Gillott in 1835. Pens are also made of silver, platinum, and alumin-ium bronze. They have also been made of vulcanite. The gold pen, which is incorrodible with ink, was also made in Birmingham for Mordan and others. Made in the United States as early as 1835, it has been also manufactured in Russia and Japan. One American firm manufactures 100,000 every year. The gold pen goes through more than forty-five different processes, from the gold-bar, purchased from the United States Assay Office, which is said to be employed, to the pen nib, and the nib to the point. To give firmness to the point of the pen it is pointed with iridium. The United States imports over half a million gross of steel pens annually, and manufactures one and a half million gross, at Cam-den, Meriden, and Philadelphia. The steel used is
mostly imported from Birmingham. In the style-
graph, or fountain pen, the nib is dispensed with, a
finely-tapered point connecting with the barrel
containing the ink; the first fountain pen was
brought out in 1848. See Bunce's Josiah Mason
(1800), which contains a sketch of the history of
the steel-pen trade.

Penance. See Catholic Emancipation, Ireland.

Penance Law. See Catholic Emancipation, Ireland.

Penance (Lat. penitentia), in Roman Catholic
theology, means both the sorrow for sin and also
the sacrament by which absolution is conveyed.
It means the voluntary or accepted self-inflicted
punishment by which a repentant sinner manifests
its sorrow for sin, and to avow the punishment which, even after the
guilt has been remitted, may still remain due to
the offence. Penance is believed in the Roman
Catholic Church to be one of the sacraments of the
Church, although it is not necessary to explain it
briefly both under its relations as a sacrament and
as a private personal exercise.

Penance as a state of mind is simply sorrow for
evil-doing, accompanied with a purpose of amend-
ment. Penance is the fruit or the manifestation of
its cause, which is a contrition or repentance,
or expressed by some of those external acts which
are the natural manifestations of any deep sorrow,
either negative, as the neglect of ordinary attention
to dress, to the care of the person, to the use of food,
or positive, as the direct acts of personal mortifica-
tion and self-inflicted pain, such as fasting, wearing
barelloth, stretching the head with ashes, watch-
ing of nights, sleeping on hard boards, &c. Such
manifestations of sorrow, whether from motives
of religion or from merely natural causes, are common
among the Eastern races, and are frequently alluded
to in the Scripture. Although, the form and manner
of the early Christians' penance found a prominent
place, and the chief acknowledged object of
the stated Fast (q.v.), and other works of mortifi-
cation which prevailed, was that of penitential
correction, or of the manifestation of sorrow for
sin.

A still more striking use of penance, however,
in the early church, was the disciplinary one; and
this, in the Roman Catholic view, is connected
with the sacramental character of penance. Any
discussion of this purely theological question would
be out of place here, and it will be enough to state
briefly that Roman Catholics number penance among
the Seven Sacraments, and believe it to be of direct divine institution (Matt. xviii. 18;
John xx. 23; 1 Cor. v. 5). The matter of this sacra-
ment consists, in their view, of the three acts of
the penitent—contrition, or heartfelt sorrow for
sin, as being an offence against God; confession,
or detailed accusation of one's self to a priest
approved for the purpose; and satisfaction, or the
acceptance and accomplishment of certain peni-
tential works, in atonement of the sin confessed.
The form of the sacrament is the sentence of
absolution from sin pronounced by the priest who
has received the confession, and has been satis-
fied with the penitential disposition of the self accuse-
ing sinner. In all these points, of course, they
differ from Protestants. Even in the apostolic
times the practice prevailed of excluding persons
of scandalous life from the spiritual fellowship of the
Christian community (see Excommunica-
tion). At times, the attempt was made to fix the day
it may be stated as certain, from the authority of
Tertullian and other writers, that from a very
early time the persons so excluded were subjected
to certain penitential regulations. The class of
offenders so treated were those who had been
notoriously guilty of the grievous crimes of idol-
alty or apostasy, murder, adultery, and other
scandalous offences. The period of penitential
proliferation differed in different times and places,
but in the primitive church it was gradually
narrowed, to the enormity of the sin, some going so far in their
rigour (see Novation) as, contrary to the clearly-
expressed sense of the church, to carry it even
beyond the grave. In the earlier ages much depended upon the spirit of each particular
church and its laws. About the 4th century the public
penitential discipline assumed a settled form,
which, especially as established in the Greek
Church, is so curious that it deserves to be briefly
described. Sinners of the clergy, already referred
to had their names enrolled, and were (in some
churches, after having made a preliminary con-
ession to a priest appointed for the purpose)
admitted, with a blessing and other ceremonial,
by the bishop to the rank of penitents. This
enrolment appears to have commonly taken place
on the appointed day of indulgence, which were
errolled arranged in four grades, called—1. (Gr. prosklainotes, Lat. fluente) 'WEEPERS'; 2.
(Gr. akroámenoi, Lat. audientes) 'HEARERS'; 3. (Gr.
hypoppontes, Lat. prosternentes) 'PRAYERSTERS';
4. (Gr. s franticas, Lat. consistentes) 'STANDERS.' Of
these classes the first two hardly appear in the
Western Church. It is a subject of contro-
versy whether, and how far, this discipline was
extended to other than public sinners; but it seems
certain that individuals, not publically known as
sinners, voluntarily enrolled themselves among
the penitents. All four grades were a distinguishing
penitential dress, in which they appeared on all
occasions of public worship, and were obliged to
observe certain rules of life, to renounce certain
indulgences and luxuries, and to practise certain
austerities. In some churches they were employed
in the service of the sick, the poor, and others of
the more laborious works of charity. The
penitent, in ordinary cases, could only be restored
to communion by the bishop who had excluded him,
and this only at the expiration of the appointed
time, unless his life might be shortened; but in
case of dangerous illness he might be readmitted,
with the condition, however, that if he recovered
from the illness the whole course of penance
should be completed. The reconciliation of peni-
tents took place commonly in Holy Week, and
was publicly performed by the bishop in the
church, with prayer and imposition of hands. In
was followed by the administration of communion. If any of the clergy were guilty of a crime to
which public penance was annexed, they were first
deposed from the rank of the clergy, and then
subjected to the ordeal, like the laity themselves.
This public discipline continued in force with
greater or less exactness in the 5th, 6th, and 7th
centuries, and was followed by semi-public,
and ultimately by private penance. In the 11th and 12th centuries the public penance
had entirely disappeared. The nature and origin of
private penance is a subject of controversy
between Catholics and Protestants; the former
calling it an ancient practice of the Church,
and the latter that it held the same place even in the ages of
public penance for secret sins which the public
penance did for public offences. At all events,
from the date of the cessation of the public dis-
cipline it has existed universally in the Roman
Church. The priest, in absolving the penitent,
imposes upon him the obligation of reciting certain
prayers, undergoing certain works of mortification,
or performing certain devotional exercises. These
acts of the penitent are held to form an integral
part of his criminal proceedings; in which he is
responsible for the same as if he were a
person.
An approach to the Roman
Catholic polity on the subject was in use among
the English Puritans of the 17th century, and more
particularly in the Church of Scotland during that
and the succeeding century, when it was common
'to make public penance on the Stool of
Repentance' (q.v.). In Ayrshire the kirk-sessions
were accustomed regularly to provide sackcloth
suit for ecclesiastical offenders as late as 1781; a
heinous breach of the seventh commandment might involve
the infliction of public penance, which, however,
(1844), desiring him to procure a 'discipline' and 'send it by R.' What was described to me was of
a very sacred character: five cords each with five
knots, in memory of the five wounds of our
Lord. I should be glad to know also whether there
were zealous adherents of their doctrinal
opinions that in all this they adopted practices
incongruous with their creed, and in harmony rather
with that of the Church of Rome. Nor do they seem
to have perceived that Church Discipline (q.v., in
its proper sense, as distinguished from ecclesiastical
rights and privileges, is wholly distinct from the imposition
of penalties by churches or church courts.
Penitential humiliations, imposed by ecclesiastical
authority, are now no more in favour where church
discipline is most strict than where the utmost laxity
prevails. The commutation of penalties is
deemed shameful, for a fine to the poor of
the parish, was an abuse once prevalent in Scotland,
but never sanctioned by the higher ecclesiastical
authorities.

PENANG

(Penang, 'Betei-nut Island'), the official but less used name of which is PRINCE
OF WALES ISLAND, one of the British Straits
Settlements, q.v., lies at the northern extremity of
the Strait of Malacca, 2 to 10 miles from the
west coast of the Malay Peninsula, and 360 miles
N.N.W. of Singapore. Length, 15 miles; breadth,
5 to 10 miles; area, 107 sq. m., three-fifths being
hilly. A sanatorium crowns the highest point,
2920 feet above sea-level. The whole is covered
with forest trees, and is without a large area of
tropical palms predominating. In the low lands the
thermometer ranges from 70° to 95°, and at the sanar-
torium from 60° to 75°. The rainfall averages
111 inches a year. Penang is a great shipping
centre for the products of the native states of the
Malayan Peninsula. The principal town of Penang
has greatly increased of late years. In 1888 the imports and exports combined reached a
total value of £15,423,458; in 1896-98 the annual
value of imports alone exceeded £10,000,000, and
of exports only a little less. By far the most im-
portant export is tin; the next being spices, sugar,
and tobacco. Georgetown, the capital, is situated
at the north-east extremity of the island, and is
defended by forts; pop. about 25,000. Province
Wellesley, on the peninsula opposite, forms part
of this same settlement. The government of Penang,
including Province Wellesley and the Dindings,
(1881) 190,597; (1891) 235,618, one-half
Chinese, nearly one-fourth Malays, and one-sixth
Tamils and others from India. Nearly two-thirds
of the total are males. Many thousands of Chinese
and Indians settling on Penang, and the arrivals
(120,896 Chinese and 20,599 Indians in 1887) are
not balanced by the departures. Province Wel-
lesley, 45 miles in length by 4 to 11 in breadth,
with an area of 276 sq. m., produces tapioca, sugar,
rice, and cocoa-nuts. Another dependency of the
settlement is the island of Penang, including the
island of Tawar, situated about 8 miles S. of Penang.
Pop. 2392. The native raja of Kedah ceded Penang
to the English in 1785 in return for an annual
pension of £1000. Thirteen years later the same
power acquired what is now Province Wellesley,
for the purpose of putting down piracy. In 1805
the East India Company, the proprietors of the
settlement, made Penang a presidency of equal
rank with Bombay and Madras. From 1826
Singapore and Malacca were united with it, but
in 1821 the government of the settlement was transferred from Penang to Singapore.

PENANG LAWYERS is the commercial name for
the stems of a species of palm imported from
Penang for walking-sticks. They are small and
hard, and have a portion of the root-stock attached, which is left to form the handle.

Pemquat Beds. See THASSIC SYSTEM.

Penates. See LARIS.

Pencils.

Pencils. A slender stick of black lead, slate, or coloured chalk, encased in a small round
piece of wood, is called a pencil; but the term is
also applied to small hair-brushes used by artists,
and it was to these that the name was originally
given. Some early manuscripts have lines upon
them ruled with ordinary metallic lead. When
pencils of Black Lead (q.v.), called also graphite and
plumbago, were first used it was uncertain, but
Beckmann points out that they are distinctly
mentioned in a book on fossils by Conrad Gesner,
printed at Zurich in 1553. The discovery of the
use of black lead as a material for writing or
drawing with was made accidentally; in some forms
where words or lines may require to be frequently
rubbed out no other substance has such valuable
properties.

For a long time the plumago from the Borrow-
lake mines in Cumberland furnished the "true"
for the best pencils ever made. These mines
have been exhausted since 1850; but when the
PENCILS

graphite from there was available it had, in the case of the larger and purer pieces, only to be cut into square rods of the proper size for pencils. In order to work up the smaller bits, cuttings, and dust of this precious material, Mr W. Brockedon, in 1843, patented a method by which he first reduced the cuttings to a very fine powder, then pressed these small pieces to powder, and then, by subjecting it to great pressure in dies from which air is exhausted, produced a cake as solid and compact as the natural graphite, and equally suitable for cutting into leads. For a considerable number of years past, owing to the Borrowstounness patents, powdery pencils, as well as colour pencils or crayons, have been made by the process invented about the close of the 18th century by Conté of Paris, which consists in thoroughly mixing the black lead with clay, both being first reduced to a state of fine division and most carefully purified. The proportions of graphite and clay vary from two of the latter to one of the former (for light hard pencils) to equal parts of the two ingredients (for the dark soft kinds). Water is added to the mixture, which is repeatedly ground, and then placed in conical moulds and squeezed in a mangle press till it acquires the consistency of stiff dough. In this state it is placed in a strong metal cylinder, whose bottom is perforated with apertures of the proper size for the section of the pencil leads. The black-lead mixture, being heated, is made into thin sheets cut through the apertures by a plunger into continuous strips or threads, which are arranged in straight lengths on a board to dry. After being exposed to a slight artificial heat, the strips are cut into the usual lengths for pencils, and placed in a covered crucible, which is raised to a red heat. When cooled they are ready for use.

An extensive mine of fine graphite was opened at Bogdalsk in eastern Siberia about 1850. Much of this black lead is scarcely if at all inferior in quality to that formerly obtained in Cumberland. Pencils have been made from this graphite in the unmixed state, and Faber of Nuremberg still makes fine pencils of it. These have the words 'Graphite de Sibérie' stamped upon them. Dixon's American graphite pencils are made from the famous "Inchamud" mine at Ticonderoga on Lake George, but it is mixed with clay as above described. Workable deposits of graphite are found at several places in Canada. A good deal of what occurs in the township of Buckingham, in the province of Quebec, is almost pure, and is made into pencils. For other localities, see BLACK LEAD.

The wood used for pencils is invariably that of the Virginia or Florida cedar (see JUNIPER), which, being straight grained and easily cut, is remarkably well suited for the purpose. Two rectangular pieces of the proper size, cut out by machinery, go to make a pencil, the one containing the groove for the lead being thicker than the other. After the lead is inserted the two pieces are glued together, and then cut to a round shape by revolving cutters. The operations of cutting out the square fillets of wood and rounding them after they are glued are very rapidly performed. Pencils are sometimes cut in a hexagonal shape. Besides the maker's name, letters indicating the character of the lead are stamped on the pencils. For Great Britain these are II, III, IV, IVH, IVH, HIH, IIIH, IIIH, and F. II signifies hard; once and twice repeated it means harder and very hard. B stands for black (and soft), and, when repeated, for still blacker. The softer grades generally are more useful, and are in the series: soft, HB, H, F. In the United States the letters used differ somewhat. They are II, hard; VII, very hard; VVII, still harder; H, soft; VI, very soft; VVI, still softer, for deep black shading; M, medium; MI, medium hard; MB, medium black.

Owing to the multiplicity of processes for reproducing pen-and-ink drawings (see ILLUSTRATION), and the cultivation of that method for book illustration, the black-lead pencil is much less used now than in the earlier half of the 19th century. Drawings in chalk or charcoal, since either material makes a much blacker line, have usually deeper and more effective shading than can be given with pencil. Still, a finished drawing in black lead by a skilled hand has charms of its own, and it is to be regretted that so few of these of any importance are now made by artists of high standing.

Coloured pencils are made with ordinary pigments—e.g. Prussian blue and chrome yellow for their respective colours—mixed with white wax and tallow or with gum and tallow, clay being sometimes added; but none of these coloured preparations are heated like those made of graphite and clay.

The arrangement of a small rod of black lead, which is kept projecting as it wears away from a tube fitted to a metal pencil-case, and which has since been so much used, was patented by Hawkins now in the familiar alloy of lead, antimony, and a little mercury is made into ever-pointed pencils for writing on paper prepared with a suitable surface.

The manufacture of black-lead and coloured pencils is carried on extensively at Nuremberg, where there are more than a score of factories, employing in all nearly 6000 hands, and producing annually some 250 million pencils, worth about £420,000. Faber founded a branch in New York in 1861. Four years later the Eagle and American Pencil Companies were established, and the other such firms, the Dixon Crucible Company, in 1872.

**Pendant.** A hanging ornament, used in ceilings, vaults, staircases, timber-foots, &c. It is sometimes a simple ball and sometimes elaborately ornamented, and is chiefly used in the later Gothic and Elizabethan styles.

**Pendulum.** See **FLAG.**

**Pendennis Castle.** See **FALMOUTH.**

**Pendle Hill.** See **CLITHEROE.**

**Pendleton,** a north-western suburb of Manchester, wholly within the borough of Salford. Pop. 40,240.

**Pendragon.** See **DRAGON.**

**Pendulum.** The two chief varieties are the simple pendulum and the ordinary or compound pendulum. Examples of the latter occur in all the former clocks, where a balance-wheel has been dispensed with (see **HORLOGE**), a small leaden or golden bullet, when suspended from a fixed point by an extremely fine thread, may represent a simple pendulum, provided it vibrates in a small circular arc. Once set in motion, this instrument will move in the same arc for ever unless interfered with, because at each swing, when descending through the first half of
its circular path, it acquires energy enough to raise it to an equal height on the opposite side. In ordinary experiments the bullet will perform many thousand revolutions, and, by itself, before the resistance of the air and other interferences cause the movement to subside and at last cease, by imperceptibly diminishing the length of the arc.

This long-continued and self-sustaining action is manifestly due to the attraction of the earth, the forces that cause it to fall to the ground, because at the end of each swing of the bullet its weight tends to pull it vertically downwards, and the string constrains it to repeat its course along the circular arc. A most interesting and valuable application of the pendulum, therefore, is for measuring the acceleration of velocities of falling bodies. For that purpose it is much superior to Atwood’s Machine (q.v.) or any other method which has yet been devised.

If the circular path or swing is short—not exceeding, for example, that of a clock pendulum which beats seconds—there are two results to be remembered. First, that so long as the length of thread is unchanged, it matters not how far the bullet may swing on each side, the time or duration of each oscillation is also unchanged. This is the principle upon which the pendulum is fixed in the church of Pisa, as he watched a lamp swinging by a chain. The quality that each swing occupies the same time is so important in horology that the introduction of the pendulum by Huygens as a time-measurer formed the principal epoch in the history of clocks. It means too, that a clock is isochronous (‘equal-timeliness’) was invented to mark this property of the pendulum. The second law of the pendulum is that to make the bullet move faster we must shorten the thread in the following proportion; for every time we double the length of the thread, we must take one-sixteenth the length. That law is otherwise expressed by saying the length of the thread is inversely as the square of the number of oscillations made in a given time (see CENTRE OF OSCIL-

These and other properties of the pendulum are wrapped up in the formula: \( \omega = \sqrt{\frac{g}{l}} \), which mathematicians have established: where \( \omega \) is time in seconds of one oscillation, \( l \) is length (in inches) of pendulum, \( g \) is the gravitational force of gravity, and \( g \) is the accelerating force of gravity, or twice the space through which a heavy body falls in one second. When \( t = 1 \) in that formula —i.e., when our pendulum beats seconds, a result easily attained at any part of the world—then immediately we have \( g = \pi^2 = 9.8696 \). In other words, multiply the length of the seconds pendulum in any latitude or longitude by the fixed number 9.8696 to find the value of \( g \). By this valuable and simple result it has been shown that the force of gravity slightly and gradually increases as we travel from the equator towards either pole, the length of the seconds pendulum diminishing in the same proportion. The poles are therefore nearer to the centre than the equator is, which is an independent proof that our planet is not a sphere but rather an ellipsoid in shape an orange rather than a lemon.

The following table readily gives the length of the seconds pendulum at any of the stations by dividing the corresponding number in the third column by 39.36. The length of the seconds pendulum, for example, is 32.191 \( \div 9.8696 = 3.262 \) feet, length of seconds pendulum. Dent’s clock in the tower of the House of Commons beats once in two seconds, and must therefore have a pendulum 13.046 feet long.

The table also shows the acceleration (feet per second) due to gravity, as ascertained from observations made by means of the seconds pendulum. The results are arranged in the order of their latitude, as shown by itself, before the resistance of the air and other interferences cause the movement to subside and at last cease, by imperceptibly diminishing the length of the arc.

Since the length of the seconds pendulum is due entirely to natural causes, and can always be easily verified, it was chosen as a standard of the British measures of length. Experience has taught, however, that these are much more easily known by preserving an artificial standard.

The universal application of the pendulum for time-measurement and ascertaining the local value of \( g \) has been followed by some special uses of it which are of interest. Thus, Sir G. B. Airy, the late astronomer-royal, has applied it to find the density of the earth’s mean density by observations taken at a coal-pit, 1200 feet deep, near South Shields. One pendulum being stationed at the surface and another at the bottom of the pit, their oscillations were measured and by means of an electric wire, with the result that if a clock were at the mouth of the pit it would gain 24 seconds per day if removed to the bottom. From these data (Phil. Trans. 1856, p. 297) the density of the earth was estimated to be 5.965.

By the Foucault experiment the pendulum was utilised in a striking manner to prove the perpetual rotation of our planet round its axis. A globe of metal is suspended by a long wire to a lofty roof, the point of suspension being vertically over the centre of a round table; and after being drawn aside from the position of rest this pendulum is allowed to begin its vibrations, but so as to have no tendency to right or left. Students of dynamics know that it must continue swinging to and fro in the same plane unless interfered with from without. Owing to that the table beneath the pendulum, when carefully observed, would revolve very slowly in a direction contrary to the hands of a watch; but since the floor and whole building revolve with the table, the observers naturally refer the relative motion to the pendulum, still swinging in its original plane. By marking twenty-four equal divisions round the edge of the table the spectators would be furnished with a good clock, the pendulum pointing out the hour at the point where it first began its oscillations, and apparently revolving in the usual direction.

The pendulum, in Horology, is absolutely accurate as a time-keeper, if only the proper length is preserved. That is mainly done by means of a screw turning on the rod, under the bob or ball, so as to push it up and therefore shorten the pendulum, or let it fall lower down and lengthen the pendulum. It was found in winter that clocks went too fast, and at midsummer too slow, because cold shortened the metallic rod and heat lengthened it. A further refinement of royal chronometers was to secure a uniform length without the screw adjustment, the result being what are known as ‘compensation pendulums.’ Both the common methods of these depend on the same principle. (A simple and practically accurate form of pendulum is made with a wooden rod, which is less liable to expansion.
Penelope, in Homeric legend, the wife of Ulysses (Odysseus), and mother of Telemachus, who was still an infant when Ulysses went to the Trojan war. During his long wanderings after the fall of Troy he was generally regarded as dead, and Penelope was vexed by the urgent wooing of many suitors, whom she put off on the pretext that she must first weave a shroud for Laertes, her aged father-in-law. To protract the time she undid by night the portion of the web which she had woven by day. When the suitors had discovered this device her position became more difficult than before; but fortunately Ulysses returned in time to rescue his chaste spouse from their distasteful importunities. Later tradition represents Penelope in a very different light, asserting that by Hermes (Marscury), or by all her suitors together, she became the mother of Pan (q.v.), and that Ulysses, on his return, divorced her.

Penguin. This name is applied to a group of birds containing three genera, Spheniscus, Eudyptes, and Aptenodytes—the largest species, the "Empress" (A. forsteri, 50 inches in height) and "King" (A. penantii) penguins, belonging to the latter genus. The most remarkable peculiarity of these birds is the flattened wing, which is clad with flat scale-like feathers; the whole limb, unfit for flight, is admirably suited for swimming. The feathers of the penguin—instead of being disposed in feather-tracts, separated by intervals (apterous) upon which no feathers grow, as is the case with all other birds, not excepting even the ostrich and cassowary—form a continuous covering to the body. These peculiarities are combined with some others in internal structure, mark off the penguins as a very distinct group of birds. By some they are placed in the same group with the auks, or in a special group (Impens) by themselves. The penguins are entirely confined to the Antarctic and to the south temperate regions (Patagonia, Cape Colony, Australia, New Zealand), and are aquatic in their habits, as is shown by the webbed feet as well as by the remarkable modification of the wings, adapted to the water. In some situations they are extremely abundant, and make their nests in a common area; the nest is nothing more than a hole in the sand in which the female deposits a single egg. The stupidity of these birds is perhaps due to the inaccessibility of the rocks and shores where so great a number live and breed; having been comparatively little interfered with by man, they show no terror at the sight of him. When intruders invade their breeding-places they can and do, however, inflict severe wounds with their sharp bills. The plumage of the neck is valued by furriers for collars and tippets; and large numbers of "Johnnies," as the sailors call them, are slaughtered annually. The flesh though dark is wholesome food, and makes excellent "hare-soup;" the belly is loaded with fat. That the penguins are not altogether a modern race of birds is shown by the remains of a species—Aptenodytes antarcticus—which existed in New Zealand in late Eocene or early Miocene times. This bird differed from existing penguins in having rather longer wings, and may therefore conceivably have possessed the power of flight; it was a large form like the King Penguin of to-day.

Penicillaria. See GUINEA CORN, and MILLET.

Penicillin, a town of Edinburghshire, on the left bank of the North Esk, 10 miles S. of Edinburgh by road, but by a branch line (1572). It has a Romanesque church-tower and large paper-mills, dating from 1709; whilst 2 miles NNE. are Glencorse barracks (1804–82), originally a dépôt for French prisoners. Pop. (1841) 907; (1891) 3362. See Wilson's Annals of Penicillin (Edin. 1891).

Peninsular and Oriental Company carry mails and passengers between Great Britain and India, China, and Australia. The company in its present form was incorporated by royal charter in 1840, although it had then had an existence of three years' duration as the Peninsular Company, which carried mails to Portugal and the south of Spain, and afterwards to Egypt. The "P. & O." own a fleet of about sixty vessels, of an average size of 5000 tons each. They carry mails from Brindisi to Bombay, weekly, in the contracted time of 12½ days; from Brindisi to Shanghai, fortnightly, in 31 days; and from Brindisi to Adelaide, fortnightly, in 24½ days. The company also maintains a three-weekly service between Venice, Brindisi, and Egypt, and in Asia has lines from Bombay to Colombo, thence to Calcutta, and to Singapore, Hong-kong, Shanghai, and Japanese ports. See the company's Pocket-book and Monthly Handbook; and for information on other great shipping lines, see the article SHIPBUILDING in this work, and works there cited.

King Penguin (Aptenodytes penantii).
Peninsular War (1807-14). The dissensions between Charles IV., king of Spain, and his son Ferdinand gave the Emperor Napoleon I. an opportunity of interfering in the affairs of that country. In pursuance of a treaty ratified on 29th October 1807, with the Spanish king, he had sent an army into Portugal under Junot, by whom Lisbon was seized, and the members of the royal house of Braganza obliged to flee to the Brazils. Ostensibly with the object of suppressing Junot's army, other French troops gradually occupied Salamanca, Valladolid, and other important positions in Spain, including Madrid, where Murat was in command. A popular outbreak against the king and his favourite, Manuel Godoy, caused the former to abdicate and his son Ferdinand to assume the crown. But the latter was induced to meet the French emperor at Bayonne, and by him held a prisoner, while his father was again proclaimed King. Riots at Madrid, Toledo, and other places during the spring of 1808 caused several deaths, and alarm that he surrendered his crown to Napoleon, by whom it was bestowed upon his brother Joseph Bonaparte, then king of Naples. He was proclaimed in Madrid on 24th July 1808.

Owing to the large powers of the local juntas, and the successful resistance fleets, the action of the capital of Spain had little effect upon that of her provinces, which rose against the French and those who favoured them in all directions. The organised forces of Spain amounted at this time to about 127,000 of all arms, while the French of the Peninsular army, consisting of 78,000 men, and of various nations, French, Swiss, Italians, and even Portuguese, was reinforced by 20,000 fresh troops. The French troops, clothing, and money were supplied by Britain to the patriots of Spain and Portugal, whose numbers rapidly increased. The first operations of the French under Marshal Bessières in the north were uniformly successful, except at Saragossa, which Wellington gallantly held against Lefebvre-Dessoumes. In Catalonia they suffered several defeats, and in Andalusia their general, Dupont, surrendered at Baylen with 18,000 men. The first armed interference of the British in the affairs of the Peninsula was the despatch on 12th July 1808 of Sir Arthur Wellesley with some 30,000 men to Lisbon, where the Tagus was fordable. Wellington, with Junot at Torla, and Soult in the meantime had defeated the Spanish at Almoradi, and captured the fortress of Badajoz. He also invested Cadiz, but General Graham with a force of 12,000 men attacked and defeated Marshal Victor's covering force at Barros on 5th March, which checked his further movements. Wellington, now designating to march on Madrid and thence against the French line of communications with Bayonne, found it necessary to capture Badajoz and Almeida. Massena, at the head of 50,000 men, marched to the relief of the latter place. He was checked at Fuentes de Oñoro on 5th May, where a hard-fought battle caused him to retreat and abandon Almeida to the British. Wellington then turned towards Badajoz, which Soult endeavoured to relieve with a force of 23,000 men. The British (7000) and Spaniards (25,000) engaged him on the 16th May in the bloody battle of Albuera, compelling him to retire, which he did in a southerly direction.

Matters were, however, in a very critical state for the British in the valley of Valencia, Asturias, and Galicia was in the hands of the French, who still had nearly 300,000 men in Spain, and had received no other check except from General Hill in Extremadura and at Tarifa, which fortress repelled Soult. Napoleon, too, threatened to take the field again in person. But this was prevented

Sent out, found matters on 22d April 1809. The French armies in Spain now numbered nearly 400,000 men, divided into eight corps d'armée, under six marshals, and operating in the north, south, east, and west. So long as Napoleon himself was able to direct operations they were characterised by unity of purpose and consequent success. Saragossa, attacked for the third time, after a memorable defence of sixty-three days, surrendered to Marshal Soult on 21st February 1809, and many victories were gained over the Spanish levies; but in Catalonia St. Cyrr effected comparatively little. The outbreak of war in Germany drew Napoleon to that country in April, and the operations in Spain were somewhat neglected in consequence. The jealousies of the French commanders too prevented any unity of action there.

Sir A. Wellesley first marched against Soult with 20,000 British and 40,000 Spanish under Cuesta, and drove him out of Portugal, to avoid Joseph, with 80,000 men under Marshal Victor, attacked at Talavera on 26th July and suffered a severe defeat. For this victory Sir A. Wellesley was created Viscount Wellington, but, being left without reinforcements, he was obliged to retire to Almeida. Wellington drove Junot out of Seville (November 20) enabled the French to overrun the whole of Andalusia, except Cadiz, which still held out. Wellington, foreseeing the impossibility of taking the offensive at that time, prepared during the winter a triple line of earthworks, 29 miles long, from Torres Vedras on the Zizarrara to Alhambra on the Tagus, thus covering his base at Lisbon. The French, 65,000 strong, under Massena, moved against him in the spring of 1810, captured the fortress of Ciudad Rodrigo on the 11th July, and attacked Béjar on 13th September. The attack was beaten off, and Wellington, carrying out his pre-conceived plan, retired slowly into the lines of Torres Vedras, carrying with him as much of the resources of the country as possible, and directing the Portuguese troops to harass the flanks and rear of the French. To avoid starvation Massena, finding himself unable to attack Wellington's fortifications, and having lost 30,000 men, began to retire on 14th November. Reinforcements having reached Wellington early in 1811, he followed, defeated Massena at Sabugal on 26th April, and forced him to the junction of the Douro and the Tagus, but Soult in the meantime had defeated the Spaniards at Gómez (February 19), and captured the fortress of Badajoz. He also invested Cadiz, but General Graham with a force of 12,000 men attacked and defeated Marshal Victor's covering force at Barros on 5th March, which checked his further movements. Wellington, now designating to march on Madrid and thence against the French line of communications with Bayonne, found it necessary to capture Badajoz and Almeida. Massena, at the head of 50,000 men, marched to the relief of the latter place. He was checked at Fuentes de Oñoro on 5th May, where a hard-fought battle caused him to retreat and abandon Almeida to the British. Wellington then turned towards Badajoz, which Soult endeavoured to relieve with a force of 23,000 men. The British (7000) and Spaniards (25,000) engaged him on the 16th May in the bloody battle of Albuera, compelling him to retire, which he did in a southerly direction.

Matters were, however, in a very critical state for the British in the valley of Valencia, Asturias, and Galicia was in the hands of the French, who still had nearly 300,000 men in Spain, and had received no other check except from General Hill in Extremadura and at Tarifa, which fortress repelled Soult. Napoleon, too, threatened to take the field again in person. But this was prevented
by the outbreak of war between France and Russia, and early in 1812 Wellington commenced his well-
known plan of investing Spain's French invader. He captured Ciudad Rodrigo on 19th January, 
stormed Badajoz on 6th April, and called in Hill's 
division from the south. Marmont, who had col-
lected his troops about Salamanca, found his flank 
threatened, and had at first to retire; but on 22d 
July the British lines of communications, and Clausew, 
who succeeded Marmont, proved so formidable a 
general that Wellington again found himself obliged 
to retire towards Salamanca and Portugal.

Events elsewhere, however, lessened the power of his 
enemy, and reducing the troops at Badajoz, 
Joseph was sent to Paris. Wellington's position was strengthened by his 
appointment as commander-in-chief of the Spanish 
and Portuguese armies. These now amounted to 
200,000 men, of which 70,000 Anglo-Portuguese 
had been brought over from England. 
He again advanced eastward in the spring of 1813, 
obliging the French to evacuate Hurgos and 
the line of the Ebro. They attempted to withstand 
him at Vittoria on 21st June, but sustained a 
crushing defeat, abandoning all their artillery, 
to, and baggage. The blockades of Pamplona 
and St Sebastian followed. Joseph, who had 
quarrelled with Soult, was superseded in 
the command, which was given to the latter. 
In spite, however, of great skill on his part, a series 
of terrible disasters had in the Pyrenees had uniformly 
disasters to him. St Sebastian was taken on 
7th October, the victory of Nivelle won on 10th 
November, and Wellington enabled to base 
himself on the northern ports. In February 1814 
Bayonne was invested, on 27th Soult was defeated 
at Orthez, and again at Toulouse on 10th April, 
which city was occupied by the British. But 
Marmont had already deserted, having, after the 
disasters Russian campaign, been overpowered by 
the allied forces of Russia, Prussia, and Austria, by 
whom France had to sign the Treaty of Paris taken. See 
also articles on France, Spain, 1812-13, Wellington, 
Napoleon, Soult, Massena, Sir John Moore, 
Vittoria, Badajoz, Teressa Vedra, Corum, Husceca, 
&c.; and Sir W. Napier's History of the Peninsular 
War (6 vols. 1829-40).

Penitential Psalms, seven of the Psalms of 
David, so called as being especially expressive of 
sorrow for sin, and accepted by Christian devotion as 
forms of prayer suitable for the repentant 
sinner. They are Psalms vi., xxxii., xxxvii., li., 
ci., cxxx., and cxliv. according to the Authorised 
Version, which correspond with vi., xxxvii., xxxviii., I., 
li., cxx., and cxlii. of the Vulgate. These 
Psalms have been selected apart from the others, 
period, and are referred to as such by Origen. 
Pope Innocent III. ordered that they should be 
recited in Lent. They have a special place in the 
Roman Breviary, and more than one of the popes 
attacked and punished to the recall of them. 
The most deeply penitential, and therefore more 
in use, both public and private, is the 51st Psalm, or 
the Misereere (50th in the Vulgate).

Penitentiary, the name given to one of the 
offices of the Papal court, and also to the dignitary 
(a cardinal, called Penitentiarius) who presided 
over it. The subjects which come under the 
notice of the Penitentiary, all those relating to the 
confessional, especially the absolution from 
sins and from canonical censures, reserved to the 
pope, and in certain cases dispensations from the 
impediments of marriage. See PRISONS.

Penkridge, a town of Staffordshire, on the 
Penn, 6 miles N. of Stafford by rail. In an 
aricultural 
district. Pop. 3134.

Penmaenmawr, a watering-place of Carnar-
vonshire, 4 miles S.W. of Conway by rail. The mountain of Penmaenmawr, the northern extremity 
of the Snowdon group, is 1553 feet high; on its 
summit are the remains of a great British fort, 
Dinas Penmaen.

Penn, Williams, the founder of the colony 
of Pennsylvania, was born at Reading, 1644. 
Penn, and was born at London, 14th October 1644. 
His early years were spent partly in Essex 
and partly in Ireland, where his father had several 
estates, the gift of Cromwell. Penn studied at 
Christ Church, Oxford, and while there was con-
verted to Quakerism by the preaching of a disciple 
of George Fox, named Thomas Lowe. His enthusiasm 
for his new faith assumed a pugnacious form. Not 
only did he object personally to attend the services 
of the Church of England, and to wear the sur-
plice of a student—both of which he considered 
eminently poltroonish and unmanly—but in 
the companions who had also become Quakers, he attacked 
several of his fellow-students, and tore the obnoxious 
robes from their backs. For this unseemly 
procedure Penn was expelled from the university. 
His father was so excessively annoyed at his 
conduct that he determined to expel him from the 
home; but he soon afterwards relented, and 
sent his son to travel on the Continent, in the hope 
that change of scene and the gaiety of French life 
would alter the bent of his mind. They failed, 
however, to effect this, but the youth certainly 
acquired a great insight into the privileges of life. 
When he returned to England, 1666, he again 
fell in with Thomas Lowe, and for attending 
Penn, and his father again quarrelled, because the 
'conscience' of the former would not allow him to 
take off his hat to anybody—not even to the king, 
the Duke of York, or the admiral himself. Penn 
was again turned out of doors by his father testy, 
but assuredly provoked parent. The matter, how-
ever, stepped in, and smoothed matters so far that 
Penn was allowed to return home, and the admiral 
even exerted his influence with the government 
to wink at his son's attendance at the illegal 
convictions of the Quakers, which nothing would 
induce him to give up. In 1668, however, he 
was thrown into the Tower, on account of a publication 
entitled The Sandy Foundation Shaken, in which 
he attacked the ordinary doctrines of the Trinity, 
and was 'satisfied.' The death of Charles II., in the death of Christ, and jus-
tification by the imputation of righteousness. 
While in prison he wrote the most famous 
and popular of his books, No Cross, no Crown, 
and Innocence with her Open Face, a vindication of 
himself that contributed to his liberation, which 
was obtained through the interference of the Duke 
of York. In September 1670 Admiral Penn died, 
leaving his son an estate of £1500 a year, together 
with claims upon government for £10,000. In 1671 
the upright but incorrigible sectary was again 
committed to the Prison for preaching; the 
Convictute Act did not touch the case, but, as he refused to
take the oath of allegiance, he was sent to Newgate for six months. Here he wrote four treatises; one of them, entitled The Great Cause of Liberty of Conscience, made his name widely known. After regaining his liberty he visited Holland and Germany for the advancement of Quakerism. The Princess-Palatine Elizabeth, the granddaughter of James I., showed him particular favour. On his return he married, in the beginning of 1672, Guiliana Maria Sufet, daughter of William Springett, and for some years thereafter continued to propagate, by preaching and writing, the doctrines of his sect.

Circumstances having turned his attention to the New World, he in 1681 obtained from the crown, in lieu of his monetary claim upon it, a grant of territory in North America. Penn wanted to call it Sylvania, on account of its forests, but the king (Charles II.) insisted on the prefix Penn in honour of his father. His great desire was to establish a home for his co-religionists in the distant West, where they might preach and practise their convictions in un molested peace. Penn, with several friends, sailed for the Delaware in September 1682, was well received by the settlers, and in October held his famous interview with the Indian tribes, under the auspices of his secretary, Adams, after the death of Kensington, and now a part of Philadelphia. He planned and named the city of Philadelphia, and for two years governed the colony wisely and well, but on strictly Puritan principles. Not only Quakers, but members of other religious sects sought refuge in his new colony, where the first the principle of toleration was established by law.

Towards the end of the reign of Charles II. Penn returned to England to exert himself in favour of his persecuted sect. His influence was not inferior to that exercised by James II.—an old friend of his father's—was so great that many people have never felt quite satisfied about the nature of their relations. The suspicion, however, that Penn allowed himself to be used as a tool by the court is not justified by any known facts, and the charge was based on an ungracious animosity which has urged the view of his complicity in some of the disgraceful incidents that followed Mompesson's rebellion—has been convicted of insubordination and inaccuracies in several important particulars. At any rate, his exertions in favour of the Quakers were so far successful that in 1686 a proclamation was issued to release all persons imprisoned on account of their religious opinions, and more than 1300 Quakers were set free. In the April following James issued an edict for the repeal of all religious tests and penalties, but the mass of Nonconformists mistrusted his sincerity, and refused to avail themselves of it. After the accession of the Prince of Orange as William III. Penn was twice accused of treason, and of corresponding with the exiled monarch, but was acquitted. In 1690 he was charged with conspiracy, but was not arrested. Nevertheless, in the following year, the charge was renewed. Nothing appears to have been done for some time, but Penn at last, through the kindly offices of his friends, Locke, Tilloston, and others, had the matter thoroughly investigated, and he was finally and honourably acquitted in 1693. In 1692 he had been deprived of his government, but it was restored to him in 1694. In the latter year his wife died, and Penn published a memoir testifying to her great virtues: but in less than two years he married again, his second wife being Harriott Callowhill, of Bristol, a Quaker lady. In 1699 he paid a second visit to the New World, where Pennsylvania required his presence to restore peace and order after the arbitrary behaviour of his deputy. His stay, which lasted two years, was marked by many useful measures, and by efforts to ameliorate the condition of both the Indians and Negroes. He departed for England towards the end of 1701, leaving the management of his affairs to an agent, whose villainy virtually ruined Penn. When the rogue adopted all the claims against his master, which Penn refused to pay, allowing himself to be thrown into the Fleet in 1708. His friends afterwards procured his release, but not till his constitution was fatally impaired. After six years of his life his memory and understanding were greatly weakened. He died at Ruscomb, in Berkshire, July 30, 1718.

To the proprietors of his descendants were bought up by a pension of £4000, which in 1884 was commuted (see PENSIONS).

See Macaulay's History of England, and J. Paget's Inquiry into the Evidence of the Charges brought by Lord Macaulay against William Penn (1858); the Life prefixed to his collected works (2 vols. 1729), and to later issues of 'select works,' and Lives by Clarkson (1840), Heworth Dixon (new ed. 1856), Robert J. Burdett (New York, 1882), and Stoughton (new ed. 1888).

Penulcula. See Fagging.

Pen-names. See PSEUDONYMS.

Pennant, Thomas, traveller, was born of a good old Welsh family at Downing, near Holywell, Flintshire, in June 1726, and was educated at Wrexham, Flintshire, and Haverford. In 1744 he went up to Queen's College, Oxford, but he left without taking a degree, having meanwhile, in 1746, ridden down into Cornwall—the first of his many tours. These included visits to Ireland (1754); the Continent (1755), where he made the acquaintance of Buffon and Voltaire; Scotland (1769 and 1772), which 'was then,' he says, 'almost as unknown as Kamchatka, but ever since has been inundated with southern visitants;' and the Isle of Man (1774), besides rambles through England and his native province. Ten times, in 1759 and 1777, was made member of the Royal Society of Upsala, an F.R.S., and a D.C.L. of Oxford; and died at Downing, 16th December 1798. From boyhood a naturalist, for years a correspondent of Linnaeus. Pennant published British Zoology (1765-77), British Quadrupeds (1771), Arctic Zoology (1780), History of London (1790), &c.; but to-day he is chiefly remembered by his Tours in Scotland (3 vols. 1771-75) and Wales (2 vols. 1776), in which works extorted from Johnson the admission: 'He's a Whig, sir, a dog; but he's the best traveller I ever read; he observes more things than any one else does.' See the amusing Literary Life of the late Thomas Pennant, Esq., by Himself (1783), and the memoir prefixed to Professor Raly's edition of the Tours in Wales (3 vols. Carnarvon, 1883).

Pennatula, an interesting animal whose quill or feather-like appearance is suggested by the term, and by the popular name Sea-pen. It is one of the Aelurocanian Actinizon, in the same sub-class as Dead-men's Fingers, Red Coral, Gorgonia, &c. One species ("P. phosphorea") is found at moderate depths (e.g. 20 fathoms) round British coasts. It consists of a basal stalk, by which the animal is probably fixed upright in the mud, and of a free axis bearing numerous polypes. The whole length is about 4-5 inches; the colour is
Pennine Alps. See ALPS.


Pennon, a small, pointed or swallow-tailed flag, borne by a medieval knight on his lance. For pennant, as well as pecon, see FLAG.

Pennsylvania, a state of the American Union, since 1830 the second in population, is in shape parallelogram, lying almost entirely between 42° and 30° 43' 26" N. lat. (Mason and Dixon's Line, q.v.), and between the irregular W-shaped Delaware River and 80° 31' 30" W. long. It is about 190 miles wide and 302 miles long from east to west; in area (45,215 sq. m.) it is the twenty-eighth state of the Union. In the north-western corner a triangular section extends to 42° 13' N., forming part of the western boundary of New York, and giving Pennsylvania about 45 miles of coast on Lake Erie, with an excellent harbour at Erie.

The Appalachian (q.v.) system of mountains crosses Pennsylvania from north-east to south-west. It here attains its greatest breadth, but none of the ridges reaches any great altitude, though a few peaks among the Alleghanys attain a height of more than 2500 feet. Between the Blue or Kittatinny Mountains on the east and the higher Alleghany range on the west lie numerous minor forested chains, interspersed with picturesque valleys, many of them rendered exceedingly fertile by the limestones which underlie their soiL The surface of the state is naturally divided into three sections, the low district south-east of the mountains, the mountainous region, and the broken hilly plain to the west. The triangular south-eastern part of the state consists of a narrow level plain near the Delaware River, with an elevation of not more than 100 feet above the sea, merging into a higher rolling region which extends to the base of the mountains. From Canada to the southern limit of the Appalachians extends an almost continuous valley, lying east of the main ranges, and separated from the coast region by the skirting south-eastern ridge. This 'great valley' is through-
northern fields; the resources of the anthracite mines are estimated as sufficient to yield 100,000,000 tons per year for two centuries. Coal production during the decade 1888-98 averaged about 45,500,000 tons. Pittsburgh is the centre of the bituminous region, and the average annual production for the same period was 39,265,977 tons. The proximity of coal and iron in such vast quantities has made Pennsylvania the leading state in coal and iron works, and leads in the manufacture of pig-iron, yielding over 4,600,000 tons in 1897, nearly one-half the total output of the United States.

The successful boring for Petroleum (q.v.) in 1859 predicted the rapid development of Pennsylvania, which was encouraged even by the discovery of gold in California. Fortunes were made and lost in a day. The mining of petroleum and the manufacture of the various articles produced from it have created new and important industries. The utilisation of natural gas for heating and manufacturing purposes has also greatly modified methods of living in western Pennsylvania. Gold, silver, copper, and tin exist in Pennsylvania, but not in paying quantities, though copper is mined to a limited extent in Montgomery county. There are large zinc-works at Lycoming, and nickel is obtained in Lancaster county.

The eastern part of the state is drained by the Delaware and its tributaries the Schuylkill and Lehigh. The Susquehanna, with its affluent the North Branch, the West Branch, and the "beautiful" tributary Juniata, is still second in extent. The Susquehanna is too rapid and too shallow for navigation, but it is used for floating quantities of timber, and coal, lumber, and other products are carried by the canals along its banks. A portion of the north-western region belongs to the valley of the Ohio, which through the greater part of western Pennsylvania is drained by the Allegheny and Monongahela rivers, which unite at Pittsburgh to form the Ohio, furnishing a great highway of inland navigation. Pennsylvania has (1897) 9865 miles of railroad and several hundred miles of canals.

The 'Pennsylvania system,' as described, has enormous financial and educational resources, subject to extremes, and much modified by differences of elevation. Heavy snows fall on the mountains in winter, and the rivers of the western half of the state are often flooded in spring and summer (see e.g. Johnstown). Nearly one-fourth of the state is wooded; lumbering is one of the sources of wealth in the north, and farther south and west are great forests of hemlock, which maintain some of the largest tanneries in the world. In the Pocono swamps and plateaus, between the Wyoming and Kittanning Mountains, the virgin growth of beech is known as the 'Shades of Death.' The soil, except in the mountains, is rich and fertile. Agriculture is a leading occupation, and in many crops Pennsylvania holds a high rank. The mountain regions and the western plateau are well suited for grazing. The cattle and dairy products are noted for their excellence. The most important industries of Pennsylvania are mining and manufacturing. The amount of capital invested is greater than in any other state, and in the value of her manufactured products Pennsylvania is surpassed only by New York. Her commerce, both foreign and domestic, is very extensive. Shipbuilding is important; river steamers are built at Pittsburgh, and iron and steel steamships, including some of the finest war-vessels in the United States and other navies, are constructed on the Delaware river, the 'Clyde of America.'

History.—The first permanent settlement in the state was made in 1643 by Sweden, at the present site of Chester. The colony of New Sweden was first, twelve years later conquered by the Dutch. In 1664 the English obtained possession, and the territory now called Pennsylvania was in 1681 granted by Charles II. to William Penn (q.v.). The friendly relations already existing between the states were established by Penn by a treaty, which was faithfully observed by both parties for more than fifty years. During the French and Indian wars, however, and again during the war of the revolution, the frontier settlements were in constant danger of attack. The great sargasso navigable even by the discovery of the Delaware, the Hudson. The public schools now are attended by over a million pupils, and there are more than twenty universities and colleges in the state. A system of Soldiers' Orphan Schools was established in 1863, and there are numerous other charitable and educational institutions. The German agriculture is a prominent element in the population; many of the miners and ironworkers, especially, are of Irish, Hungarian, and Italian birth, and serious riots have not seldom occurred (see also Molly Maguires). Among the farmers a very large proportion are of German stock, and still speak the patois known as 'Pennsylvania Dutch.' This belongs to the South German dialects, and is most closely related to the Pfalzisch; it preserves many old and curious German words, but is also interspersed with English words of German derivation, according to the locality. There are perhaps two million people around Philadelphia and New York who speak the patois; and in the country southwest in the Alleghanies they have their own dialectal newspapers. Specimens (spelt phonetically) of the dialect may be given: 'Ich trink trunken, rooter wel' (I generally drink red wine); and 'a wetter iss dr gants dank sehse gwest' (the weather has been fine the entire day). See Prof. S. S. Haldeman's Pennsylvania Dutch (1872); also A. J. Ellis's Early English Pronunciation (part iv. 1872).

The state contains sixty-seven counties, and consists thirty-two members to congress. Pennsylvania, the metropolis of the state, is the leading manufacturing city of the Union and ranks third in population (1,325,697 in 1900). The important cities are Pittsburg (321,618) and Allegheny (129,806), which form in all their interests a single community, Harrisburg, the capital (50,167), Seranton (102,626), Reading (78,961), Erie (52,733), Wilkesbarre (31,721), Lancaster (41,439), Altoona (38,973), Johnstown (33,898), Allentown (33,410), M'Keasport (34,227), Chester (33,983), York (33,708), Williamsport (28,575), &c. Pop. of the state (1850) 2,311,786; (1890) 5,288,014; (1900) 6,302,115.

Pennys.—A. pennys or pending; apparently from pund, 'a pawn,' Ger. pund, Lat. pannus, a British coin, equivalent to a pound. A single pound, or 20 shillings, is the coin of the King of the West Saxons, about the close of the 7th century. It was at this time a silver coin, and weighed about 222 Troy grains, being thus about 46th of the Saxon pound-weight. This relation to the pound-weight is evidently derived from the usage of the early Franks, who retained the Roman division of the libra into 20 solidi, and the solidus into 12 denarii (the denarius being thus the 240th part of the libra or pound). See Mark. Halfpence and farthings were not coined in England till the time of Edward I., but the practice previously prevailed of so deeply
indenting the penny with a cross mark that the coin could be easily broken into two or four parts as required. Silver farthings ceased to be coined under Edward VI., and silver halfpennies under the Commonwealth. Up to this time the penny had steadily decreased in weight; and under Elizabeth it was finally fixed at 7½ grains of silver, or ⅓ of an old copper penny closely approximated. In 1672 an authorised copper coinage of pence, halfpence, and farthings was established. In 1797 two-penny pieces were coined, but were soon withdrawn. The penny of the present bimetallic coinage, first issued in the end of 1800, is only about half the value of the old copper penny and as metal is worth only about one-seventh of a penny. The German pfennig was also originally a silver coin, bearing the same relation to the German pound of silver as the English penny to its pound. Now the nickel ten-pfennig piece is the ⅔ of the mark. The old Scots penny was only ⅗ of the English one, as the pound Scots and the Scots shilling were also ⅗ of the English coins of the same name. In the 12th century it was made very broad and thin.

Penroyal (Mentha pulegium), a species of Mint (q. v.), a native of Europe and western Asia, abundant in England and in some parts of Ireland, not found wild in Scotland, though sometimes grown there in gardens for its reputed medicinal qualities. It enjoys a high popular reputation as an emmenagogue, but no dependence may be placed in its efficacy. The name penroyal is given in North America to a small plant, Hedema pule-

goides, allied to the mints, and having, like them, a pleasant aromatic smell and a warm pungent taste. It is much in use in domestic medicine, in the form of a warm infusion, to promote perspiration and as an emmenagogue.

Penny Weddings was the name given to festive marriage ceremonies in Scotland at which the invited guests made contributions in money (seldom more than 1s. each), to pay the general expenses, and leave over a small sum, which would assist the newly-married pair in furnishing their dwelling. This practice, more rare than it once was, was prevalent in the 17th century; and, as leading to "profane malversation and promiscuous dancing," was denounced by an Act of the General Assembly, 1615, as well as by numerous acts of presbyteries and kirk sessions about the same period.

Pennywort, a trailing herb (Linaria cymbal-
aria), with roundish reniform leaves, often cultivated in hanging-baskets. Marsh or Water Pennywort is a name used for any species of the umbelliferous genus Hydrocotyle, low herbes with roundish leaves, growing in marshy places.

Penobscot, a river of Maine. The West Branch rises near the eastern limit of the splendid inlet of the Atlantic Ocean, 35 miles long and 20 wide, with numerous islands. It is tidal and navigable for large vessels to Bangor, 60 miles from its mouth. The chief trade is in lumber.

Penryn. See Cornwall.

Penrose, a market-town of Cumberland, in a picturesque and fertile valley, of medieval origin, the Church of St. John the Baptist, which is considered the oldest church in the county, and the Church of St. Mary, which is the most ancient in the country. The town is situated on a high hill, and is surrounded by a wall of stone, with gateways and towers.

Penryn, a town of Cornwall, at the mouth of a river, which is navigable for small vessels, and is connected with the sea by means of a lock. It is a port of call for the West India trade, and is celebrated for its fine view of the sea and the estuary of the river.

Pennsylvania, a state of the United States, and one of the original states. It is bounded on the north by New York, on the east by Delaware, New Jersey, and New York, on the south by Maryland and Virginia, and on the west by Ohio. It is a large and fertile state, with a population of about 9,000,000. It is divided into 67 counties, and its capital is Harrisburg.

Pennsly, a port of entry and the capital of Pennsylvania, is 244 miles by rail from New York, on the west shore of a deep bay opening into the Gulf of Mexico. The entrance is defended by Fort Moltke and Fort Pickens, the latter on Santa Rosa Island; and near by is the Pensacola navy-yard, with a marine hospital and barracks. Pensacola contains fountains and lumber and planing mills, and ships large quantities of yellow pine. It was settled by the Spaniards before 1700, occupied by the British from 1763 to 1781, and afterwards during the wars with Napoleon, taken by Andrew Jackson from the British in 1815, and the Spaniards in 1818, and passed with the rest of Florida to the United States in 1819. Pop. (1880) 6845; (1900) 17,477.

Penshurst, a village of Kent, 4 miles S.W. of Tunbridge; pop. 1673. Penshurst Place was the birthplace of Sir Philip Sidney and Algernon Sidney.

Pensions, the name formerly given to the annuity or legal adviser in every important town of Holland, because receiving a salary or pension; and, during the republic of the United Netherlands, the state secretary for the province of Holland was called "Pensionarius."—Englished by State Pensioner, no pensioner, no pensions, no pension of the province, and whatever else pertained to its welfare. The office was abolished in 1795, after the conquest of Holland by the French revolutionists. Olden Barnewelt, De Witt, and Hein-sins were the most celebrated holders of this office.

Pensions may be broadly divided into two classes, those for the general service, and those for special services. In Great Britain a sum of £1,500,000 per annum is required for superannuation in the various departments of state, including
PENSIONS

33

The consular, diplomatic, and colonial services. The number of consular pensions in 1884 was 399, 3258, and the grants for them are in the estimates classed among 'Non-effective and charitable services.' The pensions granted from the Civil List (q.v.) are altogether on a different footing from those in the civil service, which last are part of the condition of employment. The Civil List grants were in 1886 a somewhat in the nature of deferred pay. Of the same nature is the retired pay of army and navy officers, as well as the service-pensions to soldiers and seamen. Pensions to the widows and children of deceased servants of the state are often granted under the terms of the act of Parliament. The most prominent character of the burden of the non-effective services has given occasion for much discussion, and has called forth many suggestions. Thus, in the session of 1884 a motion was carried in the House of Commons, the effect of which is to restrict the system of compulsory retirement on pension of civil servants. The principle has been laid down that officials no longer required in their own departments who are still able and willing to render service for the public money should be provided with employment in other departments, instead of taking pensions upon retirement from the public service. The principle was adopted, which, after taking evidence of a curious and interesting kind, recommended that no more pensions or allowances should be granted in perpetuity. This committee also reported in favour of the abolition of all sinecure offices with salaries but no duties, and recommended that all existing perpetual pensions, allowances, and payments, and all hereditary offices, should be determined and abolished. In commutation such pensions it has been laid down as necessary to differentiate cases of grants for actual services by the original grantees, and cases of mere gratuity. Where no service or merely nominal service was rendered either by the present holder or the original grantee it was proposed that the payment should in no case continue beyond the life of the present holder. In future applications of perpetual pensions a scale of twenty-seven years' purchase was usually adopted. On or about this scale there were, between 1881 and 1887, 330 pensions and allowances of the annual value of £18,597 commuted for a sum total of £257,953. The rate was reported to be too high, and in the session of 1888 a motion was passed for giving effect to the recommendation of the select committee, and for a return in detail of all outstanding hereditary pensions and the circumstances in which they were granted. Pensions such as those of £4000 per annum to the Duke of Marlborough, and of £5000 to Lord Nelson, and to their heirs in perpetuity, are, of course, well understood as in return for 'value received' in special services to the state. The objection to the principle of them is that it is a burdening of posterity with expenses renders the nation dependent. The rewards for distinguished services should be defrayed by the generation receiving the benefit of them, and should be conferred upon the persons who actually render them, either in the form of a capital sum down, or of a life-pension only.

There are, again, a number of hereditary pensions conferred not for services, but as solutisim for the loss of the fees of abolished offices. Thus, when the offices of Custos Breivium and Clerk of the Juniers were abolished in 1837 the holders were compensated with hereditary pensions of £786 each. These were commuted on a basis of twenty-seven years' purchase. One of the numerous perquisites conferred by Charles II. upon his favourite, the Duke of Grafton, was that of Office of the Pipe, or Remembrance of First Fruits and Tenths of the Clergy in the Court of Exchequer. This office was sold by the duke in 1765, and when the fees were abolished the holder was compensated with a perpetual pension of £391, 1s. 3d., as salary, £200 for four falcons, £600 for provision of hawks, and £100 for a tent which, for other similar purposes. The case of the hereditary office of Master of the Hawks, granted by James II. to the Duke of St Albans and his heirs for ever. The emoluments consisted of £301, 1s. 3d., as salary, £200 for four falcons, £600 for provision of hawks, and £100 for tenths as above, for the period of 18 years. The total was subsequently reduced to £265, and at which it stood until commuted, in 1891, for £18,335, although there had been neither hawks nor falcons for many generations. A pension of £4000 per annum granted in 1779 to William Penn, the founder of Pennsylvania, and his heirs for ever, was in 1884 commuted for a ten years' annuity of £12,796, considered equivalent to twenty-seven years' purchase. In 1876 Charles II. granted to the Duke of Richmond and his heirs for ever a duty of one shilling per ton on all coals exported from the Tyne for consumptive purposes. The Duke of Hamilton, as hereditary proprietor of the hereditary pension of £45, 10s., and the descendants of the Heritable Usher of Scotland enjoy one of £242, 15s. These are a few of the examples of a wholly indefensible system. There are also limited hereditary pensions allowed for a certain number of lives, which are not so unjustifiable, as, for instance, the pension of £4000 to the Duke of Wellington and two successors, and the pension of £2000 to Lord Napier of Magdala and one successor. In 1891 there were eight of these limited hereditary pensions in existence (viz. Lords Combermere, Gough, the Heritable of Scotland, Keane, Napier, Raglan, and the Duke of Wellington), most of which were in the possession of the last holder. It is probable that this system of reward for military services will also be discontinued. Pensions, but for life only, may be claimed by ministers who have held office under the crown (not necessarily continuously) for four years in the first class (£2000), six years in the second class (£1200), or ten years in the third class (£500). The following is a summary of the total amount paid by Great Britain in pensions, superannuations, and compassionate allowances: we take the figures for the fiscal year 1887-88, because that period coincides with the movement to terminate perpetual pensions:

```
<table>
<thead>
<tr>
<th>Department</th>
<th>No. of Pensions</th>
<th>Amount of Payments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil Service</td>
<td>3,164</td>
<td>£407,553</td>
</tr>
<tr>
<td>Army</td>
<td>97,004</td>
<td>8,780,353</td>
</tr>
<tr>
<td>Navy</td>
<td>2,065</td>
<td>1,192,853</td>
</tr>
<tr>
<td>Perpetual and Civil List</td>
<td>1,073</td>
<td>431,688</td>
</tr>
<tr>
<td>Departmental</td>
<td>16,886</td>
<td>1,086,444</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>156,492</strong></td>
<td><strong>£7,515,575</strong></td>
</tr>
</tbody>
</table>
```

In round numbers the present outlay of the government of the United Kingdom in pensions and superannuations is about 7½ millions per annum, of which quite 5½ millions go to the army and navy, and form a partial provision for the national defence, although probably capable of better distribution. It is an open question how far the remaining 2 millions may be wisely expended, but for hereditary allowances the national accounts will not incur fresh charges, and existing charges are being equitably extinguished. On the Indian List there are set down 10,500
PENSIONS

pensioners drawing £6,000,000, of which £2,500,000 belongs to the civil and £3,500,000 to the military department.

ARMY PENSIONS are temporarily granted to officers of the army severely wounded in action at the following rates, and if the wound is so serious as to entail a permanent injury, the pension may be made permanent: Field-officer, £100 a year; major-officer, £75; lieutenant-colonel, £50; captain, £25; and a lieu-
tenant, £20. These pensions may be held together with retired pay (see RETIREMENT). If an injury of similar character is received on duty, but not in action, a general officer receives a special rate of pension; a colonel or lieutenant-colonel, £250 a year; a major, £150; a captain, £75; and a lieutenant or second-lieutenant, £50. Pensions are also granted to the widows of officers dying in the service, at rates varying from £40 a year in the lowest rank to £120 in the highest, subject to an increase of 50 per cent. if the widow is a pensioner in the Forces. A special allowance (£10 to £20, according to rank) is granted to their sons if under eighteen, and to their daughters if under twenty-one, increased by 25 per cent. if the father is killed in action. On re-
marrriage a widow forfeits her pension, but on age of sixty she may be restored if her case is deemed to be one of necessity. If the mother or sisters of an officer killed in action were dependent upon him, com-
passionate allowances may be granted to them.

Warrant officers, after more than twenty years’ service, may receive a pension varying from £8, 6s. to £40 a year, according to length of service, their widows £20, and their children £5 a year, with certain limitations.

Non-commissioned officers and soldiers, whether European or natives, are classed for pension accord-
ing to rank and service in that rank, the highest daily rate being 2s. 9d. and the lowest 6d. No soldier of less than fourteen years’ service is entitled to a pension, except for injuries sustained in action or on duty, when the rates vary from 6d. to 3s. a day, according to rank, service, extent of the injury, and character of the wounds, and the pension is not made permanent until a medical board has pronounced the injury to be a permanent disability. A special pension, in addition to any other, of £10 a year is granted to every soldier who has gained the Victoria Cross, and an addition of £5 is granted for each subsequent decoration of the order. Medals, with annuities not exceeding £20, are granted to soldiers above the rank of corporal who have performed distinguished or meritorious services, and are selected by the commander-in-chief. These annu-
ties are in addition to pension.

NAVY PENSIONS were first instituted in the reign of William and Mary; those for officers may be classed as follows: Good-service pensions, Green-
wich Hospital pensions, pensions for wounds, and the ordinary pension to which an officer may be entitled on retirement, now known as retired pay. No officer is entitled to retired pay until he is forty years of age; should he retire earlier he receives merely the half-pay of his rank. The amount of the retired pay depends upon an derived officer’s rank, length of service, and age. The maximum retired pay of a midshipman is £30 a year, of which thirty years’ sea-service as a commissioned officer is requisitible; he may in addition hold a good-service pension of £300 a year. The maximum retired pay of vice-admirals, with twenty-nine years’ service, is £500 a year; that of rear-admirals, with twenty-
seven years’ service, £400; captains, with twenty-seven years’ service, £600; of commanders, with twenty-one years’ service, £400; and of lieu-
tenants, with nineteen years’ service, £300. The retired pay of officers of other branches of the service is calculated in the same way, on length of service and age. The good-service pensions, sub-
collected, consist of ten of £300 a year for admirals, which amount to a pension of £150 a year for captains; these last are conferred on captains on the active list, and are relinquished when their holders are promoted to rear-admiral or retire. Pensions for wounds are conferred on officers and men; they range from small yearly allowances, according to rank of holder, to £150 a year, to a maximum of £200 a year.

All seamen and marines are entitled to a pension after twenty-one years’ service from the age of eighteen, or from the date of enlistment; this pension ranges from 10d. a day to a maximum of £12. 2d. a day, the increase depending upon the number of good-conduct badges a man may have; of these he may have three, and he receives an additional 1d. a day for each, and, if he holds a good-conduct medal, an additional penny for that.

Petty officers, in addition to the rates of pension already detailed, are entitled to a pension ranging from £25 a year in the case of superior petty officer 1st, £21. 1d. a year, as junior petty officer 7th, 7d. There still remain the Greenwich Hospital pensions, which are held in addition to the ordinary pensions. The idea of establishing a hospital for infirm and disabled seamen originated with the beneficence of William III., and Sir Christopher Wren was employed to build an additional wing to Greenwich Palace. The king granted £2600 a year towards it, large subscriptions were added by noble and wealthy people, forfeited and unclaimed prize-money and various grants were given, and finally the forfeited estates of the Earls of Derwentwater were added to the endowment. The revenue of the hospital is now about £167,000 a year. The Greenwich Hos-
pital pensions are divided as follows: Ten of £150 a year for admirals, six of £80 a year for captains, twenty-three of £65 for commanders, and forty-six of £50 a year for lieutenants; three of £80 and seventeen of £50 a year for officers of the old navigating branch, and fifty-seven varying from £100 to £50 a year for officers of the civil naval branches of the service. There are fifty-two of £5 and £25 a year for pensioners in the Forces, and several pensions for the men termed 'age' and ‘special’ pensions. They are given entirely at the discretion of the Admiralty, and are not granted to any per-
son whose character whilst in or after leaving the navy has not been good. A naval pensioner is entitled to a half-pay killed in 6d. a day on attaining the age of fifty-five, if he has been in receipt of his pension for five years; and for the increase of such age pension to 9d. a day at the age of sixty-
five, if he has been in receipt of his naval pension for ten years. Age pensions are given to naval pensioners, and the number of men in force at any one time is not to exceed 7500; the vacancies to be filled by those whose health renders them completely incapable of earning a living.

Special pensions are given at the discretion of the Admiralty to men unable to contribute ma-
terially to their own support, and vary in amount and duration according to each man’s degree of disability and the other circumstances of his case; the amount of the fund from which these pensions are given is limited to £22,000 a year. They are available in addition to naval and age pensions; these pensions range from £5 a year.

Widows of officers of royal navy and marines are allowed pensions, and their children compassionate allowances. These cannot be claimed as a right, and, except in the case of pensions conferred on widows of officers killed in action or dying from wounds or other special causes, are not granted to
PENSIONS

PENTATEUCH

widows whose private incomes may exceed a certain scale which is fixed by the Admiralty. These pensions in ordinary cases range from £120 to £40 a year. In the case of officers killed in action their widows, having no other income, may receive a weekly allowance not exceeding £200 a year. Compassionate allowances to children may be continued in the case of sons until they attain the age of eighteen, and of daughters until they marry or attain the age of twenty-one, but no longer, except in very special cases. These allowances vary, according to the length of time they have been in the pensions, and compassionate allowances are made to widows and children of petty officers and men at the discretion of the Admiralty, but there is no fixed scale.

The Pension System of the United States presents two peculiar features, in the almost entire absence of a civil list, and the non-recognition of long service as a ground for pension. Generally speaking, pensions are granted only for active service in time of war, and therefore the beneficiaries are the survivors (or their widows and children) of the armies of volunteers and conscripts who took part in the country's several wars. What are called 'service pensions' have been granted to survivors of the War of the Revolution (under Act of 1818); the last pensioner under this act died in 1867, aged 101. Widows of volunteer or conscripted soldiers, however, under a special act, not till 1869, aged 109), the War of 1812 (under Act of 1871), and the Mexican War (under Act of 1887), or to their widows (37 survived in 1888). But the bulk of the United States pensions are 'invalid pensions,' for total or partial disablements incurred in the service; the military or naval service; the widows and minor children under sixteen years of age of those who have died from such wounds or disease; or, in the event of no such widows or minor children surviving, then the dependent mothers, fathers, or minor brothers and sisters of officers or men so dying. The pensions, which range from $24 to $2000 per annum, are graded, and many specific wounds and disabilities are scheduled and priced. Thus, where the regular aid and attendance of others is required, from $50 to $72 a month is paid; where the labor of a car- riary for manual labor, $30 a month; for the loss of a hand or foot, or total deaf- ness, $30, but of both feet or hands, or both eyes, $72 a month; and for amputation at the shoulder or hip joint, $45. Widows of privates receive $12 a month, and $18 for five-eighths of the salary of a captain or major. The salary is $12 a month, but if the widow does not survive they receive their pension jointly. Widows or dependent relatives of officers receive from $15 to $30 a month. The pension of widows ceases when they marry. For the administration of the pension system an independent bureau was created in 1833; since 1849 it has been a bureau of the Department of the Interior. Under the commissioner, who is appointed by the president, there are nearly 2000 persons employed in the settlement of claims for pensions; and besides there are nearly 3000 sur- gardeners throughout the country engaged in examining applicants. The following figures show plainly enough the enormous growth of the American pension system. In 1862 the disbursings slightly exceeded $790,000; in 1872 they exceeded $30,743,542; in 1882 $64,000,669; in 1888 $87,000,000; in 1889 $136,634,989; in 1897 the total was $130,594,717 (the pensioners numbering 2670,014, and from 1866 to 1897 the amount aggregated $2,106,904,441; while under the Dependent Pension Law passed in June 1890, 460,282 claims were received in 1893 alone). The numbers increased over one-third the revenues of the republic (while 500,000 claims were still awaiting adjudication), and the Spanish-American war (1898) gave rise to numerous claims for disabilities.—It may be added that, by an Act of 1882, widows and minor children of keepers or crew of a life-saving or life-boat station who perish in or from injuries received through the life-saving service are given the full pay of the deceased for two years.

Pentacle, or Pentagram, a five-pointed figure of the form shown in the annexed illustration, which occurs on old Greek coins and was used as a symbol of mystery, perfection, or of the universe by Pythagoreans, Neoplatonists, and Gnostics. It occurs on mirrors of Ancient Rome, and was used as the device of various secret societies, some of them masonic, and hence appears in ecclesiastical architecture (as at Rouen). The 'wizard pentagram' was, in the middle ages, a symbol powerful in repelling evil spirits, and is familiar to readers of Goethe's Faust. On the doors of cow-houses it was held to keep off witches. The pentacle, also called pentalaphus, is often confused with the hexagram, composed of two equilateral triangles, which was also used as a magic symbol in astrology, alchemy, and cabalistic lore. See Circle (Magic).

Pentacrinia. See Crinoidea.

Pentamerone, a famous collection of fifty folktales, written in the Neapolitan dialect, by Giambattista Basile, which are supposed to be told during five days by ten old women for the entertainment of a Moorish slave who has usurped the place of the rightful princess. An admirable German translation (enriched by notes by Felix Liebrecht) appeared at Breslau in 1848. Thirty-one of the stories were translated by J. E. Taylor (1845); Sir Richard Burton printed a complete English translation in 1893 (2 vols.) (For the Decameron and the Heptameron, see Boccaccio, Margaret of Navarre). The Pentamerone stories are of the greatest value to the student of folk-tales.

Pentamerons, Beds, in Geology, a name formerly applied to the upper and lower Llandover rocks, owing to the abundance of the brachiopods called Pentamerus. See Silurian System.

Pentapolls. See Cyrenaca.

Pentateuch, a Greek word (penteuteuchos) meaning 'the five-volume (book),' is the name used by Origen to denote what the Jews of his time called the 'law' (Torah) or, more fully, the first five books of the Pentateuch. The word was adopted into the Latin by Tertullian. 'The five books of Moses' as a designation of the Pentateuch was first made current in the Western Church at a considerably later period by Jerome and Rufinus; but a Jewish writer (Josephus) had long before stated that the first five books of the Old Testament canon 'belong to Moses.' The Greek names by which the five books are now known—Genesis, Exodus, Levitius, Numbers (Aristhmoi), Deuteronomy—have come to us from the Septuagint through the Vulgate Latin. Along with the books of Joshua these five really form one continuous work, now usually referred to by modern scholars as the Hexateuch, the present division of the Hexateuch having been made by a comparatively late editor. The Mosaic authorship of the Pentateuch is nowhere affirmed in the books themselves, but it is suggested by certain obvious phenomena in various parts of them, though contradicted by others; and it had begun to be held before the Jewish canon was closed (the law of Moses,' that is, the first book of the receiving its final form). See also Books, xxv, 4, xxx, 12). It soon became a fixed ecclesiastical tradition and a tacitly established point of Christian orthodoxy, and those who doubted or denied it were generally held to be, and in fact often were, hostile to Christianity (Hobbes, Spinoza),
though this cannot be said of Leclerc, Simon, or Morinus. The facts which have generally led scholars with steadily increasing unanimity to a contrary conclusion have already been indicated under (L); where the leading documents—JE (Jahvist—Elohist), D (Deuteronomy), and P (Priests—history and Priestly legislation) have been numbered as underlaid, the present article will seek to describe these documents with rather fuller detail and to indicate briefly what is maintained by many modern critics as to the nature of the somewhat complex process by which they have reached their present state of condition.

(1) JE. This is compounded mainly from two older parallel narratives, both of which embodied in writing current oral tradition relating to the origin of the world and of man, and to the patriarchal and heroic periods of Hebrew history. The extent of the document as we now have it may be ascertained roughly by deducting D and P (see below) from our present Hexateuch, allowance being also made, however, for editorial additions and glosses. The separation of its two constituent elements is a problem of great difficulty and discussion. We may call the book of the Jahvist, which employs the name Jahweh (see Jethovith) throughout, is distinguished also, on the whole, by other well-marked characteristics, especially a naive anthropomorphism, which appears more particularly in the narratives of the patriarchal epoch, under the form of 'the angel of Jehovah,' as, for example, to Abraham, to Lot, and to Moses at the inn and also on Piagah. The style is lively, vivid, and popular. The author shows special interest in the local sanctuaries which were still recognizable in his own time, showing that they owed their origin to the theophanies in the pre-Egyptian period. His dialect is that ancient and simple form of the law contained in Ex. xxxiv. He introduces, at various places, extracts from older poetical works, such as Gen. xlix. and the quotations from 'the book of the wars of Jehovah.' For minute details as to the limits of his work reference must be made to some of the books mentioned in the bibliography appended to this article, among the more important passages in Genesis which can with considerable certainty be attributed to him are the account of the procreation and fall in ii. 4-4 iv. 26; portions of vi.; one of the two parallel accounts of the flood contained in vii. viii.; the history of Abraham in xii. xiii. xv. xvi. xvii. xix. xx. xxiv. of Isaac in xiv. 21-34, and the greater part of xxii., of the story of Jacob, including one of the narratives which make up chap. xxxiv.; portions of xxxvii., the story of Judah (xxxviii.); the story of Joseph in xxxix. xl. xli. xlii. and l. (also some fragments in the intervening chapters). (2) The Elohist, who in the book of Genesis invariably employs the name Elohim, has several distinguishing characteristics. He shows some beginnings of a tendency to remodel the ancient traditions in a less anthropomorphic sense. He does not speak of objective manifestations of the Deity by visible signs, but he is more likely to represent divine communications as being by dreams, visions, and voices. It has been remarked that he takes a special interest in the sanctuary of Beer-sheba. His dialect, if later explanations be left out, is contained in Ex. xvi. He has no doubt originally had an account of the creation and fall parallel to that of the Jahvist, but the earliest extant fragment of his work is probably that preserved in Gen. xv. 5. To him are attributed Gen. xx. 1-17, xx. 6-32, xxx. 4-14, xxxi. 1-31, xxxii. 36-43, xxxiii. 1-20, xxxiv. 1-20, and xxxv. 1-7. These portions of the remaining chapters; Ex. i. 6, 8-12, 15-22, ii. 1-10, 15, iii. 1-5, 9-16, iv. 17-23, v. 3, 5-23, vi. 1, vii. 17, 18, 20, 21, ix. 22-26, 31, 32, x. 12, 13a, 14a, 21-29, a few verses of xii. xiii. xvi. 17-19, xiv. 7, 9, 16, 22, xv. 20-23, xvii. 3-10, xviii. 1-4, xix. 10-13, xvii. 19, xxi. 1-23, xxiv. 3-8, 12-14, xlvii. 18, xxxii. 15-20, 25-29, xxxiii. 1-3, 5-11; Num. x. 37-36, xi. 1-3, 7-10, 30-34, xii. 1-15, xi. 20, 29, 24, 30-33, xiv. 39-45, portions of chap. xvi. xx. 3, 11-21, xix. 12 50, portions of the story of Balaam, xvii. 3, 5, xxxii. 16, 17, (also chap. 42); xiii. 41, 42; Deut. xxi. 14-29, xxxiv. 44, xxxxi. 14, xxxiv. 10.

That J and E once existed as separate narratives is now unanimously agreed, and that their dates must be sought somewhere between 900 B.C. at the earliest and 750 at the latest may also be regarded as settled. Within these limits there is considerable diversity of opinion. It is agreed on the whole that E belonged to the northern kingdom, and many hold this of J also, but some of the strongest critics think of the Jahvist as having been a Judæan. There is disagreement also as to the relative antiquity of the Jahvist and the Elohist, the one being older, but the preponderance of argument seems to be in favour of J. The two were brought together into the document now known as JE by a redactor (sometimes called for convenience make the Jahvist, as distinguished from the Jahvist) toward the end of the eighth century B.C. His aim was to embrace the two parallel histories; and his method was simple. Where the two were closely parallel he seems to have chosen the one he thought the preferable and to have cancelled the other (saving occasionally a word or clause); when he found the Jahvist as old as the Elohist, he was willing to support the latter, and in very different forms, such as the incident of Abraham and Sarai at Pharaoh's court, and Isaac and Rebekah at Abimelech's, he gave both, introducing some reconciling notes (e.g. Gen. xxvi. 18). A good example of his manner of combination is afforded by the narrative of Jacob's dream. JE also introduced new matter. In particular, the legislative portion of his work, usually spoken of as the Book of the Covenant (Ex. xx. 24—xxii. xxx. 33, xxiv. 28), shows the influence of the Assyrian period, and (it is held) cannot be earlier than the sixth century B.C., that is, prior to the publication of Deuteronomy.

(11) D. Deuteronomy also is a composite work, and its various elements are not all of the same date. In structure it consists of a legislative redactor to which the close of the original portions is a separate introduction (i. i—iv. 44 and i. vi. 32) and two separate epilogues or concluding narratives (xxvii. and xxviii.—xxx.). Finally, the last four chapters form an appendix containing some materials from J and E. Critics are now generally agreed that the original Deuteronomy to which reference is made in 2 Kings is what we have spoken of as the legislative kernel. The date of its publication we know to have been 621 B.C. That its composition is less certain, but no one now proposes to carry it back to an earlier date than about 600 B.C. There is little doubt as to the authorship, and hence as to the character of the prologue and epilogue. The second introduction and first epilogue, if by the author of the central portion of the book, were probably written at least a century later. The first introduction, recapitulating portions of the two epilogues, containing unmistakable allusions to the exile, are believed to have been the work of a second Deuteronomic writer about the beginning of the 7th century. A third Deuteronomic redactor to the central part of the exile (about 550 B.C.) combined JE with D, and gave what is known as the Deuteronomistic redaction to the
The gradual ascertainment in modern times of the different operations of the Hexateuch is described by Stade with hardly undue exaggeration as one of the most brilliant triumphs of human sagacity. The investigation of the problem on scientific lines may be said to have begun with Astruc (1758), who was the first to point out the value of the 'Jehovah' and 'Elohim' criteria in seeking to trace the authorship of different parts of Genesis. His hypothesis was introduced into Germany by Eliehorn, and was the beginning of a long discussion which has lasted till the present day, producing an immense literature, now for the most part quite out of date, and a vast variety of conflicting and, as was sometimes imagined, mutually destructive theories. The first cardinal fact to emerge from the chaos with clearness was the late date of Deuteronomy as being the new law book which formed the basis of Josiah's reform.

The credit of having established the doubt that the post-Mosaic authorship of Deuteronomy belongs chiefly to De Wette, whose activity dates from 1805. The next thing to be satisfactorily proved was the existence of two independent streams of Elohist and Jehovist, though the feature in common, which had been divined by Igen (1798), but it was always supposed that the one merely supplemented the other, till Hincken (1853) proved their complete independence. In other words, four distinct sources were now completely made out 1) Pre-exilic, 2) Post-exilic, 3) Jehovist, 4) Elohist. The peculiar exilic character of the legislative portion of the Priestly document (hitherto spoken of as the 'Grundschrift' or 'older Elohist'), and it was further shown by Kuenen to the satisfaction of Graf himself that the same character belongs to the Priestly document as a whole. This indeed had been seen and argued for at an earlier date by Vatke (1835) and George (1836), but partly through defects in their manner of presenting their views, and partly because scientific and theological opinion was not yet sufficiently educated to receive it, it failed to make any impression. Renan, Graf's teacher, claimed to have publicly taught the Grafilan theory as early as 1833; but he did not publish it till 1879.

As a manual of modern Pentateuch criticism Kuenen's masterly Historische Kritische Inteile und Zusammenstellung des Hexateuchs, translated from the Dutch by Wickstead (1886), is indispensable to the student, and will probably hold a permanent place as a classical example of the method of modern textual criticism. The 'Introduction' prefixed to it, containing an outline of the history of Hexateuch criticism since 1861 will serve as guide to the older literature. Along with Kuenen's great treatise ranks Wellhausen's equally admirable Composition des Hexateuchs (3d ed., with appendices, 1889). Only the appendices to this work are new, the papers on the composition of the Hexateuch having appeared originally in the Jahrbiicher f. deutsche Theol., in 1876-77, and having been reprinted without modification in 1885.

Valuable assistance of a typographical or mechanical kind is to be found in Kastner's Kritische Bearbeitung Die Genesis mit ausserer Unterscheidung der Quellenabschnitte (2d ed. 1881), in which the various sources and the work of editors and glossators are indicated by the use of differential types. In Kastner's recent new translation of the Old Testament (Die Heilige Schrift des A. T., 1890-91), P, J, E, D, Dt, and R in the Hexateuch are indicated by letters on the margin. See also Loomans, 'Die hexateuchlichen Texte und Einfluss der altorientalischen Handschriften' in the Jahrbücher f. deutsche Theol., in 1876-77, and having been reprinted without modification in 1885.

The gradual ascertainment in modern times of the different operations of the Hexateuch is described by Stade with hardly undue exaggeration as one of the most brilliant triumphs of human sagacity. The investigation of the problem on scientific lines may be said to have begun with Astruc (1758), who was the first to point out the value of the 'Jehovah' and 'Elohim' criteria in seeking to trace the authorship of different parts of Genesis. His hypothesis was introduced into Germany by Eliehorn, and was the beginning of a long discussion which has lasted till the present day, producing an immense literature, now for the most part quite out of date, and a vast variety of conflicting and, as was sometimes imagined, mutually destructive theories. The first cardinal fact to emerge from the chaos with clearness was the late date of Deuteronomy as being the new law book which formed the basis of Josiah's reform.

The credit of having established the doubt that the post-Mosaic authorship of Deuteronomy belongs chiefly to De Wette, whose activity dates from 1805. The next thing to be satisfactorily proved was the existence of two independent streams of Elohist and Jehovist, though the feature in common, which had been divined by Igen (1798), but it was always supposed that the one merely supplemented the other, till Hincken (1853) proved their complete independence. In other words, four distinct sources were now completely made out 1) Pre-exilic, 2) Post-exilic, 3) Jehovist, 4) Elohist. The peculiar exilic character of the legislative portion of the Priestly document (hitherto spoken of as the 'Grundschrift' or 'older Elohist'), and it was further shown by Kuenen to the satisfaction of Graf himself that the same character belongs to the Priestly document as a whole. This indeed had been seen and argued for at an earlier date by Vatke (1835) and George (1836), but partly through defects in their manner of presenting their views, and partly because scientific and theological opinion was not yet sufficiently educated to receive it, it failed to make any impression. Renan, Graf's teacher, claimed to have publicly taught the Grafilan theory as early as 1833; but he did not publish it till 1879.

As a manual of modern Pentateuch criticism Kuenen's masterly Historische Kritische Inteile und Zusammenstellung des Hexateuchs, translated from the Dutch by Wickstead (1886), is indispensable to the student, and will probably hold a permanent place as a classical example of the method of modern textual criticism. The 'Introduction' prefixed to it, containing an outline of the history of Hexateuch criticism since 1861 will serve as guide to the older literature. Along with Kuenen's great treatise ranks Wellhausen's equally admirable Composition des Hexateuchs (3d ed., with appendices, 1889). Only the appendices to this work are new, the papers on the composition of the Hexateuch having appeared originally in the Jahrbücher f. deutsche Theol., in 1876-77, and having been reprinted without modification in 1885.
three separate sections, followed by estimates of the historical meaning of each narrative. Dillmann placed 2
two centuries before the exile; Noldeke and Schürer still place the Parapandit edict late; Baacke states 3
it about thirty years before D. See also Holzinger's Einleitung in den Hexateuch (1883). For a fuller 4
bibliography Renz's Die heiligen Schriften, Alten Testament, 5
(1837) may be consulted. See also articles Bible, Vol. II, p. 128-9; and SAMARITAN PENTATEUCH.

Pentecost (Gr. πεντεκοστή, 'fiftieth') was the name given to the Jewish feast held on the
fiftieth day after the Passover, in celebration of the 'in-
gathering,' and in thanksgiving for the harvest. 6
(See First Sunday.)

From the time it was introduced into the Christian, 7
and with special solemnity, as being the day of the descent of the
Holy Ghost on the apostles, and of the first solemn preaching of the Christian religion.
Early times pentecost has been regarded as one of the
great festivals of the Christian year, and it was 8
chosen as one of the times for the solemn admin-
istration of baptism; and the English name of the
festival, Whit-Sunday, is derived from the white
robes in which the newly-baptised were clad. It
is extensively observed in the Third Person of the
Hallowed Trinity. Many curious usages were
anciently connected with the celebration. The
figure of a dove (an emblem of the Holy Ghost) 9
suspended by a cord from the ceiling was in some
churches lowered so as to alight on the high altar
during the service; in others figures of cloven
lungs were similarly introduced. In some places in
the East, and in the West too, the practice
prevails of decorating the churches with
evergreens and flowers, as is done in England at
Christmas.

Penelecus. See ATHENS (p. 536), and MATT.

Pentland Firth, a channel between the
Atlantic and German Oceans, separating the
Iceland of Scotland from the Orkney Islands. It is
14 miles long and 64 miles broad at the narrowest.
The Pentland Skerries, 5 miles north-east of
Duncansby Head, consist of two islets and of
several contiguous rocks. On the larger of the
islets is a lighthouse (1764). The navigation of
the Pentland Firth is more dangerous than that of
any other portion of the seas, a current from west to east flowing through it with a
velocity of 6 or 8 miles per hour, and causing numer-
ous eddies and whirlpools. Vessels of 2000 tons
with cargoes pass through the Firth annually.

Pentland Hills, in the Lowlands of Scotland,
extend 16 miles south-westward from a point 3
miles south of Edinburgh, through the counties of
Midlothian, Peebles, and Lanark, have a breadth of
4 to 6 miles, and attain a maximum height in
Carnethy (1800 feet) and Scaur Law (1803).
In the battle of the Pentlands or Rullion Green, 2
miles N.W. of Penicuik, Sir Thomas Dalyell routed
900 westland Covenanters, 28th November 1660.

Pentonville, a populous district in London in
the parish of St. James's, Clerkenwell, the first
buildings in which were erected in 1773 on
fields belonging to Henry Penton, Esq. The name
has since been extended to parts of the parish
Islington, in which stands the Pentonville Prison.
This, the Model Prison, as it was at first called,
in the Colstonian Road, was built in 1840-42, and
conforms in every way to the U-shaped or
rotating principle, so as to admit of thorough inspection. It contains accommodation for 520 prisoners. The treatment is designed to 'enforce strict separation, with industrial employment and moral training.' See Report of the Directors of Convict Prisons (periodically).

Pentremites, small Crinoids common in the
Carboniferous System (q.v.).

Pentstemon, a genus of plants belonging to
the natural order Scrophulariaceae, consisting of
herbaceous or sub-shrubby species mostly yielding
flowers of great beauty. The genus is wholly
American, though belonging to the European states
and few of them are hardly enough to endure the
winter climate of Britain, where consequently they
are propagated annually by cuttings, which are
protected in frames during winter and planted in
the flower-garden in March or April. The general
character is a large inflorescence, but, at the same
time, well known as to require no description here.
The numerous garden varieties of P. gentianoides, 10
P. Hortense, and others are among the most popular
of garden flowers. But there are many species
even more beautiful than these, which are occasion-
ally to be met in collections of rare plants. Of
such may be mentioned P. Jeffreynii, P. Secundiflo-
ris, P. Murravenus, P. minutissimus, and others,
as being exceptionally beautiful in colour.

Penumbra. See ECLIPSES.

Penza, a large rural town of Russia, 330 miles
by rail SE. of Moscow, has a cathedral (17th
century), a botanical garden, and manufactures of
paper; Pop. 47,701 (1883), in an area of 14,997 sq. miles, and its population of a million and a half are chiefly engaged in agriculture.

Penzance (Corn., 'holy headland'), a town of
Cornwall, the most westerly in England, at the
head of Mount's Bay, 10 miles ENE. of Land's
End, 15 miles S. of Plymouth, and 328 (by road
281) WSW. of London. Standing on a freely-
curved shore surrounded by rocky coves, it is
famous for its mild, equable climate, though the
annual rainfall is heavy (43 inches). Its
fine esplanade commands splendid land and sea views; and its chief buildings, excepted largely of granite, include a market-hall (1857) with a clock before it of Sir Humphry Davy (q.v.), an infirmary (1874), a post-office (1883), and public rooms (1867),
Italian Renaissance in style, and comprising a
guildhall, museum, library, &c. The harbour has
two piers (1772-1845) half a mile long, forming a
tidal basin of 21 acres; and docks have been added
since 1882. Penzance is a headquarters of the
mackerel and pilchard fisheries; market-gardening
is an important industry; and of recent years the
place has grown much in favour as a watering-
place. It was established in 1585, and sacked by
Fairfax in 1646, it was incorporated in 1648, and
from 1663 to 1838 was one of the five 'coining
towns.' Pop. (1881) 12,409; (1891) 12,448.
See works by Leth-Szyrma (1878) and Millett (1876-80).

Peonage, a system of agricultural servitude
common in Mexico (q.v.) and some other parts of
Spanish America. The peon in debt to his em-
ployer was by the Spanish colonial system bound
to labour for his employer until the debt was paid.
Peonage in New Mexico was abolished by act of
congress in 1867: it was also abolished in the
Argentina, Republic. 

Peony (Paeonia), a genus of plants of the
natural order Ranunculaceae, having large showy
flowers composed of five leafy herbaeous sepals
5 to 10 petals, numerous stamens, and 2 to 5 car-
pels, each with numerous round, black, shining
seeds. The leaves are compound, the leaflets
variously and irregularly divided. The fibres of
the root are often thin, to the touch. The species are large herbaeous perennials, or rarely
half-shrubby, natives of Europe, Asia, and the
north-west of America. None of them are truly
indigenous in Britain, although one (P. cornelliata
is undoubtedly naturalised on Steep Holme island in
the Severn. On account of the beauty of their
flowers, some of them are much cultivated in
gardens, particularly the Common Peony (P. 11

Pentecost
People's Palace, an institution at Mile End Road, intended as a centre for amusement and recreation, and of association as well, for the inhabitants of the East End of London. It comprises a large hall, technical schools, art-galleries, concert-rooms, a library, reading and recreation rooms, swimming-bath, gymnasium, &c. It is the revival and development of an idea of the Beaumont Philosophical Institute; but the idea was first amplified and made really popular in Mr Besant's novel, All Sorts and Conditions of Men (1882). The buildings were inaugurated by the Queen, May 14, 1887, and work was begun on 30 October. The Queen's Hall, which is 130 feet long by 75 feet wide, can seat 2500 people. Around the hall are the statues of twenty-two queens, and a large organ at the north end. The technical and art schools in 1890 were attended by 5000 pupils; they owe their foundation to the Drapers' Company of London, which has contributed in all about £50,000 to the People's Palace. Cheap concerts, at from 1d. to 5d. admission, have been well patronised, as also the picture exhibitions, gymnastics, swimming-bath, gymnasium, and dances. The evening classes attracted in 1898 an attendance of 900, for such subjects as elocution, physiology, drawing, machine construction, book-binding, and tailors' cutting.

See Besant's All Sorts and Conditions of Men; Sir E. Hay Currie's Working of the People's Palace; Nineteenth Century, February, 1890; Century, June 1890.

Peoria, capital of Peoria county, Illinois, on the west bank of the Illinois River, 294 miles by rail from Peoria Lake, 161 miles by railroad. It is an important railway centre—the Union Depot accommodates ten of the railways that meet here—and is connected by steamboat navigation with the Mississippi and by canal with Lake Michigan. It contains a Roman Catholic cathedral, a high school, a medical college, and three hospitals. The streets are wide, and there are ten parks, the largest, Jefferson, 35 acres. Mines of bituminous coal supply the city's numerous manufactories. These include especially the great distilleries, for which the plant is noted, and breweries, flour-mills, and manufactories of flour, oatmeal, and starch, glue, pottery, &c. In the lower city are large stockyards. Pops. (1880) 29,259; (1900) 56,100.

Peperino, a variety of tuff, met with in the Alban Hills near Rome. It is dirty greyish brown to white, earthy, and granular, and contains crystals of mica, leucite, augite, &c., with fragments of limestones, sandstone, and chalk. It is used for fireplaces, stoves, &c., and as a building material. It is also quarried in Fethard, Ireland, and in the Weald of Kent.

Pepin, or Pepian, sometimes called 'the Short,' king of the Franks, was the son of Charles Martel and the father of Charlemagne, and founder of the Frankish dynasty of the Carolingians (q.v.). Charles Martel shortly before he died divided his kingdom between his two sons, Carlemann and Pepin, Carlemann taking the German part, and Pepin the Neustrian or territories in northern France; still it they were only rulers (dukes) in the name of the Merovingian king. Carlemann, after five years of office or rule, was persuaded by the English monk Boniface to enter (747) the monastery of Monte Cassino; his duchy passed over to Pepin. St. Boniface in 751 crowned Pepin king of the Franks at Soissons, Childeric, the last of the ancient Merovingians, having been deposed and his very able substitute chosen king in his stead. Pepin rested his power in great part upon the bishops and monks; accordingly, when Pope Stephen III., who had been pressed by the Lombards (Lombards) under Aistulf, he came (754) to France to solicit help from the new king of the Franks, Pepin led an army into Italy, compelled Aistulf to become his vassal, gave to the pope the title of exarch (of Ravenna), and laid the foundation of the temporal sovereignty of the pope; himself he made 'patrician of the city of Rome—all this in 756. The church in his own dominions he placed under the supremacy of the pope. The rest of his life was spent in semi-crusading wars. Before going to Italy he had already attempted to convert the heathen Saxons at the sword's point; he went on with the 'holy' work in 757. Then he drove the Saemones back over the Pyrenees (758) and made (760-788) his holdings in Spain permanent. Though he never permanently conquered it. He died in 768, and his sons Carlemann and Charlemagne divided his territories between them. There were other rulers of this name amongst the Carolingians. PEPIN OF LANDEN (died 630), with the title of King in Ireland, was appointed mayor domus or viceroy of Austria under Lothair II.—PEPIN OF HERSTAL (died 714), his grandson, succeeded as mayor of the palace in Austria, to this added after 687 the similar vicerealties of Neustria and Aquitania, and called himself 'Duke and Prince of the Franks.' He was their real ruler during the reign of the puppet kings Theodoric, Ludwic III., Childebert III., Dagobert III., and fought successfully against the Frisians, the Alaman, and the
or C. Roxburghii yields the Long Pepper of commerce. They have woody climbing stems, solitary spikes with flowers and the fruits so close together on the spikes as in ripening to become a compact mass. The spikes are gathered when unripe, and dried in the sun. They are used in pickling and for culinary purposes, also in medicine for the same purposes as common pepper. They are generally reputed to be more pungent than common pepper.

C. Roxburghii is cultivated in eastern India, Ceylon, and Java. The root and thickest part of its stem are extensively used in India as a stimulant medicine.

Pepper acts on the skin as a rubefacient and vesicant, and is often used for this purpose in a powdered state, moistened with some kind of alcoholic spirit. It is also employed as a local stimulant in the relaxation of the uvula, and is applied in the form of an ointment to ringworm. Taken into the stomach in small quantities it is a pleasant stimulant, but in large doses it produces great pain and irritation. The quantity used, however, by the natives of hot climates much exceeds anything known among Europeans, and the effects are evidently beneficial rather than injurious.

The chief use of pepper is as a spice in vogue at present. Pepper was known to the ancients; Hippocrates employed it as a medicine, and Pliny expresses his surprise that it should have come into general use, considering its want of flavour. In the middle ages pepper was one of the most costly spices, and in the 13th century a few pounds of it were reckoned a princely present. The quantity now imported into Europe is immense. The average annual imports into the United Kingdom are about 29 million lb., of which about 7 million lb. are taken for consumption; the quantity imported into the United States is of the same order. Black pepper is considered the best kind, and the Tellicherry and Penang the finest varieties of the white.

The name pepper is popularly given to substances possessing a pungency resembling that of pepper, though produced by very different plants. Thus, Cayenne Pepper is the product of species of Capsicum (q.v.), of the natural order Solanaceae; Jamaica Pepper, or Pimento (q.v.), of species of Eugenia, of the natural order Myrtaceae; and Guinean Pepper, or Malaguetta Pepper, is Amomum, or West Indian Pepper Xylopia Althiopica, and Benin Pepper (Caraba Chin.)

Pepper. JOHN HENRY, chemist and mechanical inventor, was born in Westminster on 21 June 1821, and in 1848 was appointed analytical chemist at the Royal Polytechnic, and has written several handbooks of popular science. But he is best known as the improver and exhibitor of ’Pepper’s Ghost,’ in its earliest form the invention of Henry Dippels (q.v.), a device for associating on the same stage living persons and phantoms to act together. The phantom is produced by a large sheet of unslivered glass on the stage, practically invisible to the spectators, which reflects to them, along with a visible actor or actors, the appearance of another actor on an understage, who is himself invisible. Pepper travelled with this show in America and Australia, and became public analyst in Brisbane, Queensland.

Peppercorn Rent. A nominal rent of one peppercorn a year, to be paid on demand; an acknowledgment of tenancy when lands or houses are let virtually free of rent.

Peppermint. See MINT.

Pepper-pot, a celebrated West Indian dish, of which Cassareep (q.v.) is a principal ingredient; and along with it flesh or dried fish, vegetables,
chieflv the uripi pods of the ochre (a Hibiscus, q.v.), and chillies (see Capsicum).

Pepper-root (Dentaria diphylla), a perennial herb of the carrot family, is a native of North America, with pairs of tuberous leaves, and racemes of white flowers; the root of which has a pungent mustard-like taste, and is used as a condiment.

Pepsin has been already discussed (in the article Digestion), as one of the essential constituents of the gastric juice. Various modes of extracting it from the walls of the stomach of the calf, sheep, and pig have been proposed by different chemists. It has not been satisfactorily isolated, and its chemical constitution is unknown. 'At present the manifestation of peptic powers is our only test of the presence of pepsin' (M. Farquharson). This substance, either in powder or in solution, has been employed of late years to a considerable extent in medical practice, in cases of disorders of digestion due to deficient or imperfect secretion of gastric juice, and of convulsive and typhoid and other debilitating fevers. It is an ingredient in most of the digestive preparations now in the market.


Pepys, Samuel, the celebrated diarist, son of John and Margaret Pepys, was born on February 23, 1632-33. He was a member of a junior branch of an old and widely-spread family in the eastern counties. But there was little property in the possession of this branch, and Samuel's father for a time followed the business of a tailor in the city of London. It is not known whether the diarist was born at Brampton, a village near Huntingdon, or whether there was small property belonging to his father's family, or in the diarist's own way of thinking, ever, that he went to school at Huntingdon before entering St Paul's School, and that he remained at the latter until he was seventeen years of age. On March 5, 1650-51, he first put on his gown as a scholar at Magdalen College, Cambridge. On the 1st December 1655, very soon after leaving college, he was married to Elizabeth St Michel, a beautiful but portionless girl of fifteen. Sir Edward Montagu (afterwards Earl of Sandwich), whose mother was a Pepys, gave a helping hand to the imprudent contract. Pepys then lived in his house. But Samuel does not appear to have owed much to his father, it seems probable that Montagu acted as a patron at a still earlier period of his life. At all events his true start was entirely due to this patron, for whom Pepys always expressed the most unbounded attachment. Pepys' real life begins for us on the 1st January 1659-60, when the Diary was commenced. His appointment to the clerkship of the Acts of the Navy in 1660 was distinctly a job, for he knew nothing of the work of the navy when he undertook it, and even in a year or two the work of the navy assumed a character so utterly different from what he had expected that he was not at all prepared for it. Pepys, the diarist, never regretted the change. His main interest was his intelligence and industry were so great that he soon became master of the work of his office, and as Clerk of the Acts, and subsequently as Secretary to the Admiralty, he was one of the most distinguished officials in naval affairs ever possessed. At the Revolution his career was closed, but until the end of his life he was still looked upon as the Nestor of navy affairs, to be consulted upon matters of particular importance, and his name is still held in honour at the Admiralty. It is not, however, as an official that the fame of Pepys lives, but as the writer of a Diary which is unique in the literature of the world. This work has thrown the most unexpected light upon the history and manners of his day, while at the same time it presents a most remarkable psychological study. Never before had man written down his innermost feelings with so little disguise. Hence Pepys' character has suffered while his fame has spread. Passing thoughts which had but little real influence upon his actions were set down by him, and they have given a wrong impression of the man to numerous readers.

Pepys's life was prosperous, for he made money and held high offices. He was twice Master of the Trinity House, first in 1676 and a second time in 1685, Master of the Clothworkers Company in 1677, and President of the Board of Trade in 1693. But he was not without his troubles. At the period of the supposed Popish Plot in 1679 he was committed to the Tower, and in 1690 he was placed in Gatehouse at Westminster for a few days; and at his death in 1703 he was indebted to him to the extent of £28,000, a sum which was never paid. Early in life Pepys was successfully cut for the stone, and for many years he enjoyed good health, but before his death, on the 20th May 1703, the wound broke out afresh. The Diary was discontinued on 29th May 1669, and we must ever regret that it was not continued to a later period. The shorthand MS. was deciphered by the Rev. J. Smith and first published in 1825 under the editorship of Lord Braybrooke. Although much original matter has been added to various religious, political, and social periodicals of that time, in The London Journal (Bright 1875), the Diary had never been printed in its entirety up to 1891, when a new edition of the whole was in preparation. Besides the Diary Pepys wrote nothing of importance but his Memoirs relating to the State of the Royal Navy, published in 1690. Pepys was essentially a collector, and he never saw a curious or uncommon object without wishing to possess it. His library, bequeathed to Magdalen College, Cambridge, still remains in the exact condition in which he left it. In the room containing that library and among his books and papers we see the beginnings of that method, diligence, and general intelligence which is exhibited in the Diary, and which, united with the power of carrying out his views, helped to consolidate the British navy.

See Memoirs of Samuel Pepys, Esq., Comprising his Diary from 1659 to 1669, edited by Lord Braybrooke (2 vols. 1825); Diary and Correspondence, by Rev. Mynors Bright (6 vols. 1875); Life, Journal, and Correspondence of Samuel Pepys, by Rev. John Smith (2 vols. 1841); and particularly in that of the Rev. M. Bright (1875), the Diary had never been printed in its entirety up to 1891, when a new edition of the whole was in preparation. See Memoirs of Samuel Pepys, Esq., Comprising his Diary from 1659 to 1669, edited by Lord Braybrooke (2 vols. 1825); Diary and Correspondence, by Rev. Mynors Bright (6 vols. 1875); Life, Journal, and Correspondence of Samuel Pepys, by Rev. John Smith (2 vols. 1841); and particularly in that of the Rev. M. Bright (1875), the Diary had never been printed in its entirety up to 1891, when a new edition of the whole was in preparation. See Memoirs of Samuel Pepys, Esq., Comprising his Diary from 1659 to 1669, edited by Lord Braybrooke (2 vols. 1825); Diary and Correspondence, by Rev. Mynors Bright (6 vols. 1875); Life, Journal, and Correspondence of Samuel Pepys, by Rev. John Smith (2 vols. 1841); and particularly in that of the Rev. M. Bright (1875), the Diary had never been printed in its entirety up to 1891, when a new edition of the whole was in preparation.

Pequot, or Pequots, a tribe of American Indians, a branch of the Mohicans, were warlike and powerful in the country round the Thames River when Connecticut was first settled, and made treaties with the Dutch and English. Hostilities, however, broke out in 1637, and the tribe was cut to pieces and scattered; yet a few descendants may be found at Green Bay, Wisconsin.

Pera, a suburb of Constantinople (q.v.).

Peraea (Gr. 'the country beyond'), a term applied to many districts beyond a river or sea; most frequently to great parts of Palestine (q.v.) beyond the Jordan.

Perak, a Malay state on the west side of the peninsula of Malacca, under the protection of Britain since 1874. Estimated area, 7950 sq. m. The interior ranges up to 8000 feet. The soil is fertile, and for the most part covered with luxuriant vegetation. Elephants, leopards, tigers, monkeys, and deer swarm in the forests of the interior. The soil produces rice, sugar, tobacco, coffee, tea, vanilla, and spices. But the principal production of the state is tin; the mines, worked chiefly by Chinese, yielded 2960 tons in 1875 and 25,856 tons in 1890. Lead also exists in great quantity. Pop.,
most Malay and Chinese, increased from 55,880 in 1879 to 214,524 in 1881. The island of Kwada was also named Kito, the principal

the British have made many miles of good roads since they began to govern the country. The murder of J. W. Birch, the first British resident, in 1875 necessitated a punitive military expedition in 1876. The state is now in a highly prosperous condition, exporting to the annual value of $15,000,000, and importing to $10,000,000. See books by McNair (1877) and Swettenham (1894).

Perambulation. See Bounds (Bratislava).

Perameles. See Handicoot.

Perception, in philosophical usage, may mean internal perception, the appreciation of objects whose modification is consciousness; but it usually refers to external perception, the recognition of an external object by means of the senses—something more than sensation, and including an element of judgment or the comparing power.

Two great disputes concern themselves with perception, both raised to prominence by Berkeley. The first is the origin of our judgments of the distances and real magnitudes of visible bodies; Berkeley maintaining, in opposition to the common opinion on this subject, that these were learned by experience, or known by the senses, were not in vision (see Vision). The second question relates to the grounds we have for asserting the existence of an external and material world. See Berkeley, Kant, Reid; also Psychology, Philosophy.

Percival, Spencer, English minister, was the second son of the second Earl of Egmont, and was born in London, November 1, 1762. He was educated at Harrow and Trinity College, Cambridge, and was called to the bar at Lincoln's Inn in 1786. He soon obtained a reputation as a diligent lawyer, and in 1796 he entered parliament for Northumberland, and became a strong supporter of Pitt. In the Addington administration he was made Solicitor-general in 1801 and Attorney-general in 1802, and in the Portland administration of 1807 he became Chancellor of the Exchequer, and was even then the real head of the government, though more truly, by George IIIi, for his steadfast opposition to the Catholic claims. On the death of the Duke of Portland in 1809 Percival became premier also, and retained office till his tragic death, 11th May 1812, when he was shot dead entering the lobby of the House of Commons. Great was the consternation caused by a Liver-

pool broker named Bellingham, whose losses had turned his head. Percival's death was rather a private than a public calamity. He was a man of spotless integrity in his public and private character, but, though an effective parliamentary debater, his abilities were only moderate and his views were narrow.

Percival, James Gates, an American poet, was born at Kensington, Connecticut, 15th September 1763, graduated at Yale in 1815, at the head of his class, and afterwards studied botany and medicine. But his heart was not in herbs and classifications; and although he professed—or rather advertised his willingness to practise—both in Kensington and in Charleston, S.C., very few professional calls dragged him from his favourite studies. His poems Promethus and Oio appeared at Charleston in 1822. Two years later he filled for a few months the chair of Chemistry at West Point; but he found the duties heavy and irksome, and took himself to Boston, and then to New Haven. There the third part of Oio was published (1827). Percival afterwards divided his attention between his verses and geology, and as he grew older he gave more and more of his time to the new love, the visible results being Reports on the Geology of Connecticut (1842) and of Wisconsin (1856). These are valuable but very dry, and in delusions contrast to his poems, which flow freely and with volume, and on whose fluent, half-crescendo, and more lines their author's learning is borne as easily as trees on a river in flood. His Dream of a Day appeared in 1843, and occasional lyrics for a long time after. He was appointed geologist of Wisconsin in 1854, and died there at Hazel Green, on 20 May 1856. His collected works were published in 1859, his Life and Letters, by J. H. Ward, in 1866.

Perch (Perca fluviatilis), seven indistinct dark bands on the back. In length it measures about 18 inches, and its height is about a third of this. It sometimes weighs from three to five pounds, and a prize of nine pounds has been recorded. Among its characteristics may be noted the small villiform backward-turned pectorals, their presence on the palatine, and visceral, their absence from the tongue, the two dorsal fins, of which the first has thirteen or fourteen spines, and the small scales on the body. The perch loves still waters, and thrives well in ponds, at the cost, however, of smaller fishes. It also feeds on insects, worms, &c. It can endure removal from the water for a considerable time. The eggs are laid in spring, and are attached in long viscid strings to water-weeds. The number of eggs in one spawn may exceed a million. As an edible fish the perch has a good reputation, eating best with lemon-juice and catsup-pepper, but the American variety is less esteemed. Of species distinct from P. fluviatilis little is known.—The so-called Climbing Perch (q.v.) is separately treated.

Perch, a measure of length. See Rod.

Percival.多数为马来人和中国人，从1879年到1881年，人数增加到55,880人。该岛名为Kwada，又名Kito，是主要的居民地。自他们开始统治该国以来，情况发生了很大的变化。1875年发生了一起谋杀案，即J. W. Birch，他是第一位驻该岛的英国居民，需要进行一次惩罚性的军事远征。该州目前处于高度繁荣状态，每年出口价值为15,000,000美元，进口价值为10,000,000美元。见书McNair (1877)和Swettenham (1894)。

Perambulation。意为界限(布拉蒂亚)。

Perameles。见Handicoot。

Perception，哲学上使用时，意指对外部感知，对物体的欣赏，而不是仅仅通过感觉，还包含判断或比较的能力。两个主要的争议涉及感知，由伯克莱提出，两人都对存在外部世界提出质疑。见Berkeley，Kant，Reid；亦见心理学，哲学。

Percival，Spencer，英国政治家，是第二代伊蒙顿男爵的次子，1762年11月1日出生在伦敦。伯克莱大学接受过教育，并在林肯厅律师学院学习，1786年成为律师。随后，他在1796年进入下议院，担任诺森伯兰郡议员，并成为皮特的坚定支持者。在安登顿政府时期，他担任索德里尼和内阁的律师，1801年和1802年担任大律师，1807年担任财相，成为政府的实际领导人。在1809年，道尔顿伯爵去世后，他成为政府首脑，但在1812年5月11日，他被枪杀身亡。珀塞尔的死亡是私人灾难，他是一位德高望重的作家和私人品格，但尽管他是一位有效的辩论者，他的能力是有限的，观点是有限的。

Percival，James Gates，美国诗人，1763年9月15日出生于康涅狄格州肯辛顿，1815年毕业于耶鲁大学，以他班的头名毕业，并随后学习了植物学和医学。但他的心不在草药和分类学上，尽管他曾经承诺——或者更确切地说，他宣称他的愿意——在肯辛顿和查尔斯顿，S.C.，很少有专业性的来访者能让他从他最喜欢的学科中挣脱出来。他的诗《普罗米修斯》和《奥伊》出现在1822年查尔斯顿。两年后，他为西点军校的化学教授工作了一段时间；但他发现这项工作很沉重，令人厌倦，于是他将自己转向波士顿，并随后到了新罕布什尔。他在那里完成了《奥伊》的第三部分。1827年，佩尔塞尔的注意力分散在诗歌和地质学之间，随着年龄的增长，他将越来越多的时间投入到新爱好上，即地质学，结果是，他在康涅狄格和威斯康星州撰写了报告，这些报告是很有价值的，但也很枯燥，与他的诗歌形成了对比，后者自由流畅，音量丰富，与他那流利的，半声乐的，和更多的线，作者的学习被天生的，就像树上一样流过，他的《梦与日》出现在1843年，并发表了一些偶然的歌词。在他的诗歌和地质学之间，随着年龄的增长，他将越来越多的时间投入到新爱好上，即地质学，结果是，他在康涅狄格和威斯康星州撰写了报告，这些报告是很有价值的，但也很枯燥，与他的诗歌形成了对比，后者自由流畅，音量丰富，与他那流利的，半声乐的，和更多的线，作者的学习被天生的，就像树上一样流过，他的《梦与日》出现在1843年，并发表了一些偶然的歌词。在他的诗歌和地质学之间。
Percussion: Medicine, is the method of eliciting sounds by tapping gently but distinctly the surface of the body; its object being to determine by the nature of the sound the comparative density of the subjacent parts. This means of diagnosis was first employed by Alenbrugger in the middle of the 18th century, and it was afterwards adopted by the French and German physicians, but its value was not fully appreciated till Laennec made the diseases of the chest his peculiar study; and since his time its application and various uses have been extended by the labours of Pierry, Hugues Bennett, and other physicians.

Percussion is the discussion of the diagnosis of the lungs, heart, and abdominal organs. It may be direct (or, as some writers term it, immediate), or it may be indirect. In the former case, the part to be examined is struck with the ends of the first three fingers set close together. When the patient, or with a small hammer tipped with india-rubber; while in the latter, which is now almost universally adopted, a flat body is placed upon the chest, or other part to be examined, and is then struck by the fingers or hammer, the intensity of the percussion is termed Plicimeter (from the Gr. peluitis, 'a blow,' and metron, 'a measure'). The instrument usually sold as a plicimeter is a flat oval piece of ivory, but the left index or middle finger of the physician, with its flat surface fitted accurately to the part to be examined, is sufficiently well. The sense of one or both strokes on the plicimeter—whether the stroke be made with the fingers or the hammer—must vary according as it is desired to elicit the sound from a superficial or a deep-seated part. The surface to be percussed should be exposed, or, at most, only covered by clothing. The admeasurement of the admeasurement of the depth of the cavity filled with air—as the stomach or intestines—a hollow, drum-like, or (as it is usually termed by medical writers) a tympanitic sound is produced. When the patient, or with a small hammer tipped with india-rubber, is so placed, and the surface of the chest is struck below where there is a considerable depth of healthy lung-tissue, consisting of small cells filled with air, a clear sound, less loud and hollow than the tympanitic sound, and termed the pulmonary percussion depending only on the vibrations of air in the lung-cells, and whereby the vibrations of the walls of the chest, is evoked. When the subjacent substance is solid (as the heart, liver, or spleen) or fluid (as when there is effusion into a closed sac) the sound is dull in proportion to the density and want of elasticity of the part struck. Important information is also gained by attending to the varying degree of resistance experienced by the fingers during percussion over different parts of the surface. The first thing that must be acquired in order to make percussion useful in the diagnosis of disease is an accurate knowledge of the sounds elicited from the different parts in their normal condition. When, for example, the healthy pulmonary percussion note is known, increased resonance of the walls of the chest will indicate a dilatation of the air-cells (or the pulmonary emphysema), an aggregate of dullness will afford evidence of such morbid changes as the effusion of fluid into the pleura (Hydrothorax), or inflammatory solidification of the lung-tissue (the Hydatid of Pneumonia), or malacic or dry emphysema. Percussion in relation to diagnosis is further shown in the articles PERICARDIUM and PLEURISY. Diagnosis by Auscultation (q.v.), directly and by means of the Stethoscope (q.v.), is often used in connection with percussion.

Percussion Caps are small copper cylinders, closed at one end, for conveniently holding the detonating powder which is exploded by the act of percussion. See FULMINATES; also FIREARMS, Vol. IV, p. 639.

Percussion, Centre of. See Centre of Percussion.

Percy, a noble northern family, famous in the history of England for five hundred years. Its founder, William de Percy, was the Conqueror to England, and was rewarded with lands in Hampshire, Lincolnshire, and Yorkshire—among the last being Topoiffe and Spofforth, long the chief seats of the house. The male descendants became extinct in the direct line, and the representation of the house devolved upon his daughter Agnes, who married Josceline of Louvain, brother-in-law of King Henry I., on the condition that he assumed the name of Percy. Their youngest son, Richard de Percy, then head of the family, was executed in the chieftains who extorted Magna Carta from King John, and the ninth feudal lord, Henry de Percy, gave much aid to Edward I. in the subjugation of Scotland, and was made governor of Galloway. The latter was driven out of Turnberry Castle by Robert Bruce, and was rewarded by Edward II. with the empty honour of Bruce's forfeited earldom of Carrick, and the governorship of the castles of Bamborough and Scarborough. In 1309 he obtained by purchase from Bishop Antony Bek the barony of Alnwick, the chief seat of the family ever since. His son, Earl Richard, and his son-in-law, Percy, King David II. of Scotland at the battle of Neville's Cross (1346); his grandson fought at Crécy; his great-grandson, the fourth Lord Percy of Alnwick, was marshal of England at the coronation of Richard II. On the death of John Earl of Northumberland, Henry, eldest son of the last, was the famous Hotspur whom the dead Douglas defeated at Otterburn (1388), and who himself fell at Shrewsbury (1403) fighting against King Henry IV. His brother, Thomas Percy, Earl of Warkney, was executed immediately after the battle. Their father, who had turned against Richard II., and helped Henry of Lancaster to the throne, was dissatisfied with Henry's gratitude, and with his son plotted the insurrection which ended in Shrewsbury fight. Later he was rewarded, but fell at Bramham Moor (1408), when his honours were forfeited on attaint, but restored in 1414 to his grandson Henry, the second earl, from which day the Lancasterian loyalty of the family never wavered. Henry became High Constable of England, and fell in the first battle of St. Albans (1455). His son Henry, the third earl, fell at Towton (1461), and it was his brother, Sir Ralph Percy, who comforted himself as he lay bleeding to death on Hedgehog Moor (1464), that he had 'saved the bird in his bosom.' The title and estates were now given to Lord Montagu, a brother of Warwick, the king-maker, but in 1469 Henry, the son of the third earl, subscribed an oath of allegiance to Edward IV., and was restored. He was murdered at his Yorkshire house of Cockledge, in 1489, in an outbreak of popular fury against an extortionate subsidy of Henry VII. The sixth earl, Henry-Algermon, in youth had been the lover of Anne Boleyn, and was forced against his will to marry a daughter of the Earl of Shrews-

bury. He died childless in 1507, and, as his brother, Sir Thomas Percy had been attainted and executed for his share in the Pilgrimage of Grace, the title and honours were forfeited, and the title of Duke of Northumberland was conferred by Edward VI. upon John Dudley, Earl of Warwick, who in turn was attained and executed under Mary in 1558. That queen in 1557 granted the earldom to Thomas
Percy, son of the attainted Sir Thomas Percy. A devoted Catholic, he took part in the Rieging of the North, and was beheaded at York in 1572. His brother Henry succeeded in the original family at Alnwick, and invested in Tengemouth's conspiracy in favour of Mary Stuart, and was committed to the Tower, where he was found dead in bed, with a pistol beside him, whether through suicide or murder, 21st June 1585. His son, the ninth earl, was imprisoned by Elizabeth, but escaped, and found £30,000 on a baseless suspicion of being privy to the Gunpowder Plot. He was followed by his son, the tenth earl, who fought on the parliamentary side in the Civil War, and was succeeded by his son Josceline, the eleventh earl, with whose death in 1670 the male line of the family became extinct. Charles II. created in 1674 his third bastard by the Duchess of Cleveland, Earl, and afterwards Duke, of Northumberland, but the titles expired on his dying childless in 1716. The eleventh earl's only surviving child and heir, in her own right Baroness Percy, married Charles Seymour, Duke of Somerset, and became the mother of Algernon, Duke of Somerset, who was created in 1749 Baron Warkworth and Earl of Northumberland, with remainder to his son-in-law, Sir Hugh Southwell, fourthly, of Worksop. Sir Hugh Southwell succeeded to the earldom in 1750, assuming the surname and arms of Percy, and was created in 1766 Earl Percy and Duke of Northumberland. The sixth duke succeeded in 1867.


Percy, Thomas, editor of the famous Reliques of Ancient English Poetry, was born a grocer's son at Bridgnorth in Shropshire, April 13, 1729. He was educated at the grammar-school there; in 1746 entered Exeter College, Oxford, and in 1753 was presented by his college to the sequestered vicarage of Easton Maudit, Northamptonshire, where he lived for twenty-five years. In 1756 he married happily, and three years after received also the adjacent rectory of Wilby. His leisure soon yielded fruit in his An Essay towards a New Dramatick Language, a Chinese novel translated from the Portuguese, and Miscellaneous Pieces relating to the Chinese (2 vols. 1762), as well as anonymously in Five Pieces of Chinese Poetry translated from the Mandarin (1763), prompted by Thomas Howard, afterwards Viscount Howard, in his Translation of the Song of Solomon from the Hebrew (1764). In the summer of 1764 Dr Johnson paid him a long visit at Easton Maudit. In later days they sometimes quarrelled, but continued to retain a high regard for each other. 'A man out of whose company I never go without having learned something'—so Johnson described him to Boswell. 'I am sure that he vexes me sometimes, but I am afraid it is by making me feel my own ignorance.' In the February of the following year (1766) Percy published in the Reliques of Ancient English Poetry (4th ed. 1770, an enlarged edition by H. Wheatley, 3 vols. 1886). He had long been engaged in collecting old ballads from every quarter, and a large folio MS. of ballads had fallen accidently into his hands, having been found 'lying dry on the floor under a Rhenish in the Parlour' of his friend Humphrey Pitt of Shifnal, in Shropshire, 'being used by the maids to light the fire.' This he claimed as the original of his work, but of the 176 pieces in the first edition actually only 42 were taken from the folio MS.; while almost all those actually from it were so touched up and tricked out in false ornament and conventional 18th-century poetical diction as often to bear but little likeness to their originals. For example, the 39 lines of the 'Child of Eli' have been put out to 200 in Percy's version, nor do even all the 36 originals themselves appear. Again, the 'Heir of Lin' has swollen from 125 lines to 216, and these, moreover, produced to death. The antient Rieging, in his Ode to the Centurp. Micke these" prefixed to his Ancient Songs from Henry III. to the Revolution (1790), attacked Percy with characteristic acrmony, denied the very existence of the folio MS., and denounced the work as an impudent forgery, and that the worse became the clergyman. Percy exhibited the MS. in Pall Mall, and had his portrait painted by Sir Joshua Reynolds holding it in his hand. For over a hundred years it lay hid in Eaton Hall, jealously guarded from almost all eyes, until at length Mr Furnivall, instigated by Professor Child, succeeded in getting it printed in vols. 1867-85; (those deservedly marked by the biographer "useless and humorous' being printed separately), with Introductions by Professor Hales and himself. The MS. was 134 inches long by 53 wide and about 2 inches thick, and was written in a Caroline hand.

The publication of Percy's Reliques was first suggested to him by Smollett. The work was dedicated to the Countess of Northumberland, and the author was soon rewarded by being made chaplain to her husband, the first duke of the present creation, while he also succeeded in persuading her to propose marriage to the nobler born Percy. In 1769 he became chaplain to George III., and next year he took his degree of D.D. at Cambridge, and published his translation of the Northern Antiquities of the Swiss historian Paul Henri Mallet (1759-1807). About 1771 his wife was appointed nurse to the Prince Edward, afterwards father of Queen Victoria; it was to her, before their marriage, that Percy addressed the famous ballad, 'O Nancy wilt thou go with me?' first printed in 1758, and happily set to music by an Irishman, Thomas Carter (c. 1733-1864). In 1771 Percy wrote a novel prefixed to the Prince Edward, afterwards father of Queen Victoria; it was to her, before their marriage, that Percy addressed the famous ballad, 'O Nancy wilt thou go with me?' first printed in 1758, and happily set to music by an Irishman, Thomas Carter (c. 1733-1864). In 1771 Percy wrote a novel prefixed to the book. During the reign of George III. Percy was appointed to the deanship of Carlisle, in 1782 to be Bishop of Dromore, with £2000 a year. His only son died in 1783; his wife in 1806; he himself, after a few years of blindness, 30th September 1811—the only survivor of the original chieftains of his family's famous Literary Club. He left two daughters, and was buried in the transept which he himself had added to Dromore Cathedral.

For the literary influence of the Reliques, see the article HALLAX. A good Life by the Rev. J. Pickford is prefixed to vol. i. of the edition of Furnivall and Blackmore. Many of his letters are given in vol. viii. of J. B. Nichols's Illustrations of the Literary History of the 18th Century. His name was assumed by the Percy Society (94 issues, 1840-52).

Percy Anecdotes, a collection of extraordinary popularities, published in monthly parts (1829-33) by 'Shalto and Reuben Percy, Brothers of the Benedicite Monastery of Mount Benger.' Their real names were Thomas Byerley (died 1825), first editor of the Mirror; and Joseph Clinton Robertson (died 1832), projector and editor of the Mechanics' Magazine; the work owed its name to the Percy Coffee-house in Rathbone Place, their usual place of meeting during its progress. An edition was prepared by John Timbs (1852).

Peregrine Falcon. See FALCON.

Pereira, Jonathan, pharmacologist, was born at Shoreditch, London, 22nd May 1804, and was successively lecturer on chemistry and physician to the London Hospital (1841). Elected a Fellow of the College of Physicians in 1845, he acted as examiner in Matier Maligia and Pharmacy from the establishment of the London College until his death, 20th January 1853. His books were Elements of Matier Medicin (1839-40), and treatises on Diet and on Polariised Light (1843). See Memoir (1853).
PEREFONIST.

PEREFONISTS. 45

Pereslav, a town of Russia, 96 miles NE. of Moscow by rail. It has a 12th-century cathedral, cotton-manufactures, and lake-fisheries. Pop. 7466.

Perez, Antonio, minister of Philip II. of Spain, was born in Aragon in 1539. His reputed father was an ecclesiastic who was secretary to Charles V. ministered Philip II., and was himself appointed to this office when only twenty-five years of age, and acquired the entire confidence of the king. Don John of Austria having set his confidant, Juan de Escovedo, to Spain, to solicit aid against the party of Orange, and Escovedo having rendered himself an object of suspicion to the king as an adherent of Don John's ambitious schemes, Philip resolved to put him out of the way by murder, and entrusted Perez with the accomplishment of this design, which Perez accomplished accordingly, 31st March 1578. The family of Escovedo, with that of their principal enemies joined against him. The king at first sought to shield him; but in July 1581 he was arrested, and by torture forced to confess. He succeeded, however, in making his escape to Aragon, where he put himself under protection of its kings, which secured a trial in open court. The king, charging him with heresy, now applied for aid in May 1591 to the Inquisition, and the Aragonese court delivered him up to its agents; but the people rose in tumult and liberated him. This happened repeatedly; and at last, in September 1591, Philip II. entered Aragon with an army powerful enough to subdue all opposition, and abolished the old constitutional privileges of the country. Perez, however, made his escape, was condemned in Spain as a heretic, but was treated with great kindness by Philip II., who himself the was the intimate of Bacon and the Earl of Essex. He spent the later years of his life in Paris, and died there, 3d November 1611, in great poverty. Perez wrote Relaciones (1598), which states recent writers have regarded as lying fabrications.

See Mignet's monograph (5th ed. 1881); Morel-Fatio, L'Espagne au XVI., et au XVII. Siecle (1878); also Froude in The Spanish Story of the Armada (1892); and works cited at Philip II.

Perfectibility, or PERFECTIONISM, the doctrine that man in a state of grace may attain to perfection in this life. Catholics hold that no one, not even the most holy, can avoid sin altogether except by a special privilege of God, as in the case of the Blessed Virgin; the justified do not, however, commit mortal, but venial sins (see S.N.). In various points Francisians, Jesuits, and Molinists approach to a doctrine of perfection denied by Dominicans and Jansenists. Among Protestants, Wesleyan Methodists believe in the attainability of a Christian perfection attainable in this life. It is not a perfection of justification, but a perfection of sanctification; which John Wesley, in a sermon on Christian Perfection, from the text Heb. vi. 1, Let us go on to perfection, earnestly contends for as attainable a state of life by believers. It is founded chiefly on the commandments and promises of Scripture concerning sanctification; guarding his doctrine, however, by saying that it is neither an angelic nor an Adamic perfection, and does not exclude ignorance and error of judgment, with consequent wrong affections, such as 'needless fear or ill-grounded hope, unreasonable love, or unreasonable aversion.' He admits, also, that even in this sense it is a rare attainment. The Friends profess that the justified may be 'free from actual sinning and transgression of the law of God, and in that respect perfect; but not so both in respect of growth; and there remaineth a possibility of sinning where the mind doth not most diligently and watchfully attend unto the Lord.' Other schools also hold similar views; but most Protestants repudiate the doctrine of Perfectibility. The general belief of Protestant Christians is that those who have professed a belief in their own perfectibility were merely more self-complacent and less sensible of their own corruptions than is usual, and that the commands and promises concerning sanctification are all in explanation consistent with remaining corruption in believers, and a need of further sanctification, or a continued going on unto perfection whilst this life endures.

Perfection, Counsels of. See Supererogation.

Perfectionists, also called Bible Communists and FREE-LOVERS, a small American sect, founded by John Humphrey Noyes, who was born at Brattleboro, Vermont, on 15th July 1811, graduated at Dartmouth in 1830, then studied law, and afterwards theology at Andover and Yale. While a theological student, he experienced a second conversion, discovered that the prevailing theology was wholly wrong, and lost his license to preach. He held that the gospel if accepted secures freedom from sin; that God has a dual body (male and female); that the author of evil is uncreated, but not God; and that communion with Christ not merely saves from sinning, but from disease and death. He now founded a 'Perfectionist' church at Putney, Vermont. He and his converts, men and women, with their children, put their property into a common stock; they gave up the use of prayer, all religious service, and the observance of the Sabbath; those who were married renounced their marriage ties, and a 'complex marriage' was established between all the males and all the females of the 'Family.' Having dispensed with law, he set up public opinion as a controlling power in its stead; and free criticism of one another by the members of the society became an important feature of his system. In 1849, after not a few difficulties, the community removed to a new home in the sequestered district of Oneida, in the state of New York, and soon numbered some 300 members, living in strict order and with much outward comfort on thoroughly communalistic principles—the community of women and of children being an
outstanding feature carefully regulated by the 'mutual criticism' of the family. In 1880, however, the presence of outside opinion forced the family to modify their views. The original perfect family relationship was introduced; communism of property gave way to limited liability joint-stock, each member having a separate share represented by so much stock in the Oenida Community, Limited. Various co-operative institutions were established. The headquarters are at Kenwood, New York, and works have been started also at Niagara Falls, Ontario, Noyes, who assisted in establishing the new constitution, died at Niagara Falls, 13th April 1886.


Perfumery. Perfumes are of two distinct classes—those derived from plants and those which are of animal origin.

Vegetable Perfumes.—The most ancient of the so-called primary odoriferous bodies are the so-called gunn-resins which exude naturally from the angiosperms, as oozes; marriage accidental or purposely inflicted to increase the yield. The most important are benzoin, myrrh, epononox, tola, Peru, and storax. Gum-resins form the chief ingredients in 'Incense' (q.v.) and Pastilles (q.v.).

A second group is that large class of perfumes which are produced by distillation, and are most of them fluid bodies, and are termed Volatile Oils, Essential Oils, or Ottos—formerly Quintessences (see Oils). As soon as the Greeks and the Romans learned the use of the still, which was an invention im- parted to them from Egypt, they quickly adapted it to the distillation of the odorous principles from the numerous fragrant plants indigenous to Greece and Italy. Long before that time, however, fragrant waters were in use in Arabia. Odour-bearing plants contain the fragrant principle in minute glands or sense-cells. These are found sometimes in the rind of the fruit, as the lemon and orange; in others it is in the leaves, as sage, mint, and thyme; in wood, as rosewood and sandalwood; in the bark, as cassia and cinnamon; in seeds, as caraway and nutmeg; in yet others in the petals, as in rose, lavender, or lilac; in flowers, as in rose; in wood, as in orris, a solid resembling cocoa-butter, and is contained in what is really the rhizome of Iris florentina, though technically called orris-root. These glands or bags of fragrance may be plainly seen in a thin-cut stratum of orange peel; so also in a bay leaf, if it be held up to the sunlight, all the oil-cells may be seen like specks. All the fragrance-bearing substances yield by distillation an essential oil peculiar to each; thus is procured oil of patchouli from the leaves of the patchouli plant, Pogostemon patchouli, a native of Burma; oil of caraway, from the caraway-seed; oil of geranium, from the oil of the Pelargonium roseum; oil of lemon, from lemon-peel, Citrus limonum; and a hundred of others of infinite variety.

For the various essential oils or ottos are very slightly soluble in water, so that no distillation the water comes over is always fragrant. Thus, elder-water, rose-water, orange-water, dill-water are, as it were, the residue of the distillation for obtaining the several ottos. The prominent (q.v.) is very simple: the fragrant part of the plant is placed in the still and covered with water, and when the water is made to boil the ottos rise along with the steam, are condensed with it in the pipe, and remain floating on the water, from which they are easily separated by decanting. In this way 100 lb. of orange, lemon, or bergamot fruit peel will yield about 10 oz. of the fragrant oil; 100 lb. of cedar-wood will give about 15 oz. of cedar-wood ottos; the ottos from nutmeg will yield 60 to 70 oz. of oil of nutmeg; 100 lb. of geranium leaves will yield 2 oz. of oil.

Every fragrant substance varies in yield of essential oil. The variety of essential oils is endless; but there is a certain relationship among odours as among flowers. The lemons, like nutmegs are the most numerous, such as verbena, lemon, bergamot, orange, citron, citronella; then the almond-like odours, such as heliotrope, vanilla, violet; then spice odours, cloves, cinnamon, cassia. The whole may be classified into twelve well-defined groups. All these ottos are very soluble in alcohol, in fat, butter, and fixed oils. They also mix with soap, snuff, starch, sugar, chalk, and other bodies, to which they impart their fragrance.

The principal consumption of the cheaper sorts of fragrant ottos is for scenting Soaps (q.v.), most of which are perfumed with the Alpes Martial state with the several ottos or mixtures of them. The best qualities of soaps, however, are scented cold by grinding or squeezing the previously dried soap between granite rollers after having been mixed with the perfumes. With perhaps the exception of the 'secrets' used for snuffs and tobacco can scarcely be termed perfumes. There is a large consumption of fragrant essential oils in the manufacture of toilet powders; under the various names of rose powder, violet powder, &c.; a mixture of starch and ottos, differently scented, is used for the same purpose—drying the skin of infants after the bath. Precipitated chalk and powdered cuttle-fish bone, being perfumed with otto of roses, powdered myrrh, and camphor, become ' Dentifrices. The ottos of peppermint, lavender, rose, and others are extensively used in flavouring sweetsmeats and lozenges.

It is found that some flowers either do not yield an essential oil by distillation or yield it in quantities too small to be commercially available. The perfume from these is collected by the process called 'absorption.' The flowers of many of our marin- times follow this method on a very large scale with the following flowers: rose, orange, anemon, violet, jasmine, tuberose, and jonquil. In the valley of the Var there are acres of flowers, the blossoms of which are gathered by women and children, and dried in little Tagam beans fishermen's baskets, hanging over the shoulders. They are then carried to the laboratory of flowers and weighed. In the laboratory great quantities of grease, lard, and beef-suet have been collected, melted, washed, and clarified. In each laboratory there are several thousand châlzes or châlères ('sashes'), upon which the grease to be scented is spread, and upon this grease the blossoms are sprinkled or laid. The châlze en verre is, in fact, a frame with a glass in it as near as possible like a window-sash, only that the frame is two inches thicker, so that while the leaves of the flowers are kept together, there is a space of four inches between every two glasses, thus allowing space for blossoms. The flower blossoms are changed every day, or every other day. The same grease, however, remains in the châlze so long as the particular plant being used yields blossoms. Each time that a flower is put on, the grease is 'worked'—i.e. stirred with a knife—so as to offer a fresh surface of grease to absorb odour. The grease being enfleurée or 'enflowered' in this way for three weeks or more—i.e. along with the plants produce blossoms, the fat is finally boiled of aromatic matter, i.e. is at last scraped off the châlze, melted, strained, and poured into tin canisters, and is now fit for exportation. Fat or oil is perfumed with these same flowers by the process of maceration—i.e.
infusion of the flowers in oil or melted fat. For this end purified fat is melted in a bain marie, or warm water bath, and the fresh blossoms are immersed for the required time. When they are procured, the spent blossoms are strained away, and new flowers added repeatedly, so long as they can be procured. Oil does not require to be warmed, but improved results are obtained when it is slightly heated.

Some perfumers produce best perfumed grease by enfleurage, but rose, orange, and acacia give more satisfactory products by maceration; while violet and jonquil grease is best obtained by the joint processes—enfleurage followed by maceration. In the place of glass the space is filled with a wire-net on which is laid a mohlera, or other cotton fabric—moleskin, soaked with oil; on this the flowers are laid, just as with solid grease. In due time—that is, after repeated changing of the flowers—the oil becomes fragrant, and it is then pressed out of the molletters, as far as odour is concerned. In this case the grease is made as solid as is consistent with the required purposes. In order now to obtain the perfume of these flowers in the form used for scenting handkerchiefs, we have only to infuse the scented fat or oil, made by any of the above methods, in strong alcohol.

Some perfumers think that it is not too thick a fluid that it has to be chopped up as fine as suet is chopped, put into the spirit, and left to infuse for about a month. In the case of scented oil it has to be repeatedly agitated with the spirit. The result is that the spirit extracts all the odour, becoming itself 'perfumed,' while the grease again becomes odourless. Thus is procured the essence of jasmine, essence of orange-flowers, essence of violet, and others already named, rose, tuberosa, acacia, and jonquill. It is right to mention that the reason for producing a pomade—these scented fats are technically termed pomades—by distilling essential oil obtained by the distillation of orange-blossoms with water has not, in the least degree, the odour of the orange-blossoms from which it is obtained. The otto in fact undergoes a chemical change, and is no longer 'spangled' as far as odour is concerned. It is called Neroli, and is valued at from £16 to £20 the lb. weight, the variation depending upon the crop, which is of course greatly influenced by the season. The same remarks apply, though in a less marked degree, to rose. Since the rise in the cost of the rose industry may be gained from the following summary showing the weight of these particular flowers grown in the south of France in 1889:

<table>
<thead>
<tr>
<th>Flowers</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>orange-blossoms</td>
<td>1860 tons</td>
</tr>
<tr>
<td>roses</td>
<td>930</td>
</tr>
<tr>
<td>violets</td>
<td>147</td>
</tr>
<tr>
<td>jasmine</td>
<td>147</td>
</tr>
<tr>
<td>tuberosa</td>
<td>74</td>
</tr>
<tr>
<td>cassia</td>
<td>30</td>
</tr>
<tr>
<td>jonquill</td>
<td>15</td>
</tr>
</tbody>
</table>

The seat of the rose industry for the production of otto of roses is Bulgaria, more especially the cantons of Kezanlik and Karlova. Here no less than 5600 lb. were produced in 1889 at an average value of 20s. per oz.

**Perfumes of Animal Origin.**—Only four of these are used in perfumery—viz. Musk (q.v.), Ambergris (q.v.), Civet (q.v.), and Castor (q.v.).

The aroma of musk freely imparts odour to every body with which it is in contact. Its power to impart odour is such that polished steel will become perfumed. If a small amount of musk is placed in a box where there is musk, contact not being necessary, in perfumery manufacture tincture of musk is mixed with other odorous bodies to give permanence to the more evanescent perfumes or bouquets. This musk acting to them almost as a virulant does to a dysenteric. The usual statement as to the length of time that musk continues to give out odour is exaggerated. If fine musk be spread in thin layers upon any surface, and fully exposed to a changing current of air, all fragrance, it is said, will be gone in from six to twelve months. The finest musk, that which indeed is only really useful in perfumery, is distinguished as Tonquin musk, the average price of which is about 90s. per oz.

Civet is exceedingly potent as an odour, and when pure, and smelled at in the bulk of an ounce or so, is utterly insupportable from its nauseousness; in this respect it exceeds musk. When, however, civet is diluted so as to afford but minute quantities to the olfactories, then its sweet perfume is generally used. We learn, that the fragrant musk is the same as that breathed by the beautiful narcissus. Civet is extensively used duly attenuated in perfumery. Its powerful and lasting odour enables it to be used in soaps, and especially in satchets. It is one of the perfumes of 'Spanish Leather,' or Peau d'Espagne; the first gloves used in England were scented with it. Several thousand ounces are annually imported, the average price of which is about 7s. per oz.

Caster is in our day said to be almost obsolete as a perfume, but in former times, or although it cannot be largely used in any given perfume on account of the almost blackness of its tincture, still when properly diluted it is extensively employed. Its perfume, when old, especially, is exceedingly pleasant, and its fixing power is at least equal to that of musk. About 1500 lb. of castor are annually imported, which fetch on the market about 36s. per lb.

Of late years the progress of scientific chemistry has led to the production of numerous odoriferous substances, some identical with the active odoriferous principles of plants. Among them may be mentioned vanillin, the principle of vanilla (methyl protocatechualdehyde); commarou, of Tonquin bean (commiric anhydride), and many derivatives of phenol; but the majority of this class of bodies are more used in confectionery for flavouring than in perfumery. The artificial musk of L. Bauer is a delightful perfumy substance, and has many applications in perfumery; but it differs widely in odour from true musk.

The perfumes or bouquets of the shops are really mixtures of some or several of the primitive odours of the two above-mentioned groups. An example or two will illustrate this. 'Jockey Club Bouquet' is thus compounded: 2 gal. extract of orris, 3 gal. each of cassia, rose, and tuberosa pomades; 4 gal. civet; 7 gal. musk; 1 gal. spirits of wine; 8 oz. bergamot otto; 1 oz. rose. 'White Rose' consists of 1 gal. pomade, 1 pint spirits of wine; 1 pint essence of jasmine; 1½ pint spirits of wine; ¾ oz. rose otto; 1 drm. patchouli otto. It is obvious that the possible variety is infinite, since there are some sixty or more primitive odoriferous substances.


**Pergamus, or Pergamum,** anciently a city of Mysia in Asia Minor, on the river Caicus, 15 miles from its mouth. According to tradition, the place was founded by Greeks from Arcadia. It first acquired prominence when Lyons, one of Alexander's generals, chose it as a stronghold in which to keep his treasures. Under Philaretus, his eunuch, whom he appointed guardian of his treasures, it became the capital of a state, 283 B.C., under Cleitus I., and was the seat of independence against the Seleucids, although the title of king was first assumed by Attalus I, who reigned from 241 to 197 B.C., and defeated the Gauls in a great battle. He intimately allied himself with the Romans against Philip of Macedon, and this alliance subsisted throughout succeeding reigns, during which the kingdom continued to increase in extent and importance. Attalus III, surnamed Philometer, who died in 133 B.C., left it to the Romans, and under them it was one of the chief cities of Asia Minor. The native kings had
Periglese, Giovanni Battista, Italian musician, was born at Jesi, near Ancona, on 3d January 1716, studied music at Naples, and struck up a melodic style for himself. His first great work was the oratorio of San Gregorjmo, composed in 1731, in which year appeared his bright and tuneful oratorio of La Sera Padrona. This his masterpiece; it was revived in London in 1753. In 1766 he wrote another oratorio of the Church of Loreto. In consequence of delicate health he removed to Pozzuoli, where he composed the cantata of Orfeo and his second masterpiece, the pathetic Student Mater, but died immediately afterwards on 16th March 1786. Besides the works quoted above, he composed numerous operas, oratorios, and other sacred pieces.

Peri, according to the mythical lore of the East, a being begotten by fallen spirits, which spends its life in all imaginable delights, is immortal, but is for ever excluded from the joys of Paradise. It takes an intermediate place between angels and demons, and is neither male or female. So far as we have seen only female Peris, as is supposed by some, and these the wives of the Devis, the Peris live, on the contrary, in constant warfare with these Devis. Otherwise, they are of the most innocent character to mankind, and, just like the fairies with whom our own popular mythology has made us familiar, are when female of surpassing beauty. They belong to the great family of gentii, or Jinn (see DEMONOLOGY).

Perigun, a large cane composed of the trunks of two trees, hollowed and united into one handle; when an ordinary cane is formed of the body of one tree only.

Perianth. See FLOWER.

Pericardium, a conical membranous sac containing the heart and the commencement of the great vessels, to the extent of about 2 inches from their origin. It is placed with its apex upwards beyond the sternum in the interval between the pleurae, the serous sacs in which the lungs are enclosed, while its base is attached to the diaphragm. It is a fibrous-serous membrane, consisting of an external fibrous and an internal serous layer. The outer layer is a strong, dense, fibrous membrane, while the serous layer invests the heart, and is reflected on the inner surface of the fibrous layer. Like all serous membranes, it is a closed sac; its inner surface is smooth and glistening, and secretes a thin fluid which serves to facilitate the natural movements of the heart. It is inflammation of this memlbranes or serous sacs which constitutes the disease known as pericarditis.

DISEASES OF THE PERICARDIUM.—Pericarditis is a disease of frequent occurrence; the result of a very large number of post-mortem examinations being, that one out of every twenty-three of all who die at an adult age exhibits traces of recent or old attacks of this disorder. The first change which takes place in an inflamed pericardium is a dulling of its glistening surface, with some congestion, which is speedily followed by effusion into the sac. The effusion is sometimes almost entirely fibrous, in which case it coagulates, and gives rise to adhesions between the heart and the pericardium; or it may consist almost entirely of serum, which remains liquid; or it may be a mixture of the two. In a few cases it rapidly becomes purulent. In the cases that prove fatal when fibrous fluid has been effused, but has not coagulated to such an extent as to cause complete adhesion of the heart to the pericardium, the partially coagulated fibrous or liquid is seen to be of a yellowish-white colour, and to occur in a rugged, shaggy, or cellular form. Lacenae compared the surface on which the lymph is deposited to that which would be produced by suddenly separating two flat pieces of wood between which is the layer of butter had been compressed. When the patient dies at a more advanced stage of the disease—viz., soon after the whole of the membrane has become adherent—incipient blood-vessels, in the form of red points and branching lines, are seen, indicating that organisation is commencing in the deposit, which if death had not ensued would have been finally converted into cellular or acellular tissue, and might have occasioned the complete obliteration of the pericardial cavity.

The recognition of the disease depends almost entirely on the signs revealed by inspection and percussion. The earliest is generally the friction-sound, or to and fro murmur, caused by rubbing together of the roughened surfaces, and heard to accompany the heart's action; but if fluid is effused it may speedily disappear. In this case percussion of the chest shows that the dull area occupied by the heart is larger than normal, while the impulse of the organ on the chest-wall cannot be felt. The symptoms, besides those common to all inflammations, are extremely variable; in some cases where pericarditis comes on in the course of other serious disease the patient makes no complaint, and the complication is only discovered during the routine examination of the chest. But there may be intense pain and tenderness on pressure in the region of the heart, great irregularity or feebleness of the heart's action, distressing breathlessness, deafness, &c.

Pericarditis is a disease which occasionally runs a very rapid course, and terminates fatally in forty-eight hours or less. In ordinary cases, however, which terminate in apparent recovery, the disease generally begins to yield in a week or ten days, and, exceptions apart, adhesion usually appears to be complete in three weeks or less. If the adhesions which have formed are dense and fibrous, they may impede the heart's action and lead to serious symptoms at some subsequent period.

Pericarditis rarely occurs as an independent disease. It may result from extension of an inflammation in a neighbouring organ, pleura, ribs, &c. It is an uncommon result of a contaminated state of the blood, such as occurs in the exanthemata, especially scarlatina, and Bright's disease of the kidney; but, beyond all parison, it is of most frequent occurrence in association with acute Rheumatism (q.v.), of which it forms one of the most serious complications. It is often associated with inflammation of the muscular sacs around the heart, and, especially in rheumatism, of the lining memlbranes as well as the pericardium. The treatment of pericarditis at present in favour is much less active than when bleeding, mercurialisation, &c. were considered necessary. Complete rest in bed, light diet, with opium or other sedatives as necessary. In some general cases the disease is suited with that which the pericarditis is associated; local application of poultices or cotton-wool, sometimes of leeches or blisters, are the chief measures
PERICLES was the ancient either the Athens. extending order strong The the the name favour his century ^litical A shadow Three 457

Pericarp. See Fruit.

Pericles, the greatest statesman of ancient Greece, was born of distinguished parentage in the early part of the 5th century B.C. His father, in the Xerxes, the limit of the Persian at Mycale, 479 B.C.; and by his mother, Agariste, the niece of the great Athenian reformer Cleisthenes, he was connected with the princely line of Sicyon and the great house of the Alcmeonid. He received an elaborate education; but of all the teachers one whom he most revered was the serene and humane philosopher Anaxagoras. Pericles was conspicuous all through his career for the singular dignity of his manners, the Olympian grandeur of his eloquence, as 'majestic intelligence,' in Plato's phrase, his sagacity, his liberality, and his marked benevolence to his fellow-men. Both in voice and in appearance he was so like Pisistratus that for some time he was afraid to come forward in public life. When he entered on public life Aristides had only recently died, Themistocles was an exile, and Cimon was fighting his battles for the Athenian colonies. Although the family to which he belonged was good, it did not rank among the first in either wealth or influence, yet so transcendent were the abilities of Pericles that he rapidly rose to the highest power in the state, the leader of the dominant democracy. The sincerity of his attachment to the popular party has been questioned, but without a shadow of evidence. At anyrate the measures which either personally or through his adherents he brought forward and caused to be passed were always in tenor of extending the privileges of the poorer class of the citizens, and, if he diminished the spirit of reverence for the ancient institutions of public life, he enlisted an immense body of citizens on the side of law. He extended enormously, if he did not originate, the power of the Areopagus as a court of justice for citizens as well as for foreigners. He took steps for the military service, for acting as dikeut and in the Ecclesia, and the like, as well as for admission to the theatre—then really a great school for manners and instruction. Pericles seems to have grasped very clearly, and, to have held on to the modern radical idea, that, as the state is supported by the taxation of the body of the citizens, it must govern with a view to general interests rather than to those of a caste alone.

About 463 Pericles, through the agency of his follower, Ephialtes, struck a great blow at the influence of the oligarchy, by causing the decree to be passed which deprived the Areopagus of its most important political powers. Shortly after the democracy obtained another triumph in the ostracism of Cimon (401). During the next few years the ostracism of Pericles is distinctly intelligible to us, but it is safe to say that in general his attitude was hostile to the desire for foreign conquest or territorial aggrandisement, so prevalent among his ambitions fellow-citizens. Shortly after an obstinate war in which he showed conspicuous courage, Pericles majestically carried the measure for the recall of Cimon. His successful expeditions to the Thracian Chersonese, and to Sinope on the Black Sea, together with his colonies planted at Naxos, Andros, Eresus in Euboea, Itea in Macedonia, and Aegina, as well as at Thurii in Italy and Amphipolis on the Strymon, did much to extend and confirm the naval supremacy of Athens, and afford a means of subsistence for her poor. But his greatest project was to form in concert with the other Hellenic states a grand Hellenic confederation in order to put an end to the mutually destructive wars of kindred peoples, and to make of Greece one mighty nation, fit to front the outlying world. The idea was not less than it was enormous. But its accomplishment the semi-barbarous Macedonians would have menaced the civilised Greeks in vain, and even Rome at a later period might perhaps have found the Adriatic, and not the Euphrates, a limit of its empire. But the Persians were utterly incapable of appreciating such exalted patriotism, or of understanding the political necessity for it, and by their secret intrigues the well-arranged scheme was brought to nothing. Athens and Sparta were already in that mood towards each other which enabled the disaster of the Peloponnesian war inevitable. When the Spartans in 448 restored to the Delphians the guardianship of the temple and treasures of Delphi, of which they had been deprived by the Phocians, the Athenians immediately after marched an army toward him who had been deprived of it. But later an insurrection broke out in the tributary Megara and Euboea, and the Spartans again appeared in the field as the allies of the insurgents. The position of Athens was critical. Pericles wisely declined to fight against all his enemies at once. A brigade of ten talents sent the Spartans home, and the insurgents were then thoroughly subdued. The thirty years' peace with Sparta (445) left him free to carry out his schemes for the internal prosperity of Athens.

Cimon was now dead and a successor in the leadership of the aristocratic party by Thucydides, son of Melesias, who in 444 B.C. made a strong effort to overthrow the supremacy of Pericles by attacking him in the popular assembly for squandering the public money on buildings and in festivals and amusements. Thucydides made an effective speech; but Pericles immediately rose and offered to execute the buildings at his own expense, if the citizens would allow him to put his own name upon them instead of theirs. The sacrifice was successful, Thucydides was restored, and the oligarchic party resigned the undisputed master of the public policy of Athens. During the rest of his career 'there was,' says the historian Thucydides, 'in name a democracy, but in reality a government in the hands of the first man.' And the Athens of his day was the home of Aeschylus, Sophocles, Euripides, Anaxagoras, Zeno, Protagoras, Socrates, as well as Myron and Phidias; while there flourished at the same time, but elsewhere in Greece, Herodotus, Hippocrates, Pindar, Empedocles, and Democritos. The centre of this splendid group was Pericles, of whom the truthful pen of Thucydides records that he never did anything unworthy of his high position, that he did not flatter the people or oppress his adversaries, and that with all his unlimited command of the public purse he was personally incorruptible. Soon after this the Samian war broke out, in which Pericles gained high renown as a naval commander. This war originated in a quarrel between Miletus and the island of Samos, in which Athens was led to take part with the former. The Samians defeated the Athenians, but were in the end overthrown, and peace was concluded (439). The position in which Athens then stood towards many of the Greek states was peculiar. Since the time of the Persian invasion she had been the leader of the confederacy formed to resist them, but the destruction of the Persian power and the guardian of the confederate treasury kept in the isle of Delos. Pericles caused the treasury to
be removed to Athens, and, commuting the contingents of the allies for money, enormously increased the contributions to the patriotic fund, Athens herself undertaking to protect the confederacy. The grand charge against Pericles is that he applied the money thus obtained to other purposes than those for which it was intended; in short, he adorned and enriched Athens with the spoils of the allied states. To his mind Helles was subordinate to Athens, and he confounded the splendour of the dominant city with the splendour of Greece in a manner possible to a man of poetic imagination, but not to a statesman like the Great Helles. His enemies, who dared not attack himself, struck at him in the persons of his friends. Phidias was flung into prison for the impurity of introducing portraits of himself and Pericles into the battle of the Amazons depicted on the shield of the goddess Athena in the Parthenon; the brilliant Aspasia, the famous mistress of Pericles, was arraigned on a charge of impurity, and only acquitted through the eloquence of Pericles on her behalf; while the aged Anaxagoras was driven from the city.

To give a detailed account of all that Pericles did to make his native city the most glorious in the ancient world, Greek architecture and sculpture under his patronage reached perfection. To him Athens owed the Parthenon, the Erechtheum, left unfinished at his death, the Propylaeum and Grecian art, and patrician and sacred edifices; he also liberally encouraged music and the drama; and during his rule industry and commerce were so flourishing a condition that prosperity was universal in Attica.

At full length in 431 the long foreseen and inevitable Peloponnesian war broke out between Athens and Sparta. The plan of Pericles was for Athens to follow a defensive attitude, to defend the city itself, leaving Attica to be ravaged by the enemy, but to cripple the power of Sparta by harassing its coast. The story of the war is told elsewhere; here it is enough to say that the result was fatal to Athens for reasons for which Pericles was only in small part to blame. He trusted in the ultimate success of Athens both from her superior wealth and from her possessing the command of the sea, but he had not foreseen the subsequent deterioration in her citizens' spirit, nor upon the military courage of the Boeotian and Spartan infantry. Nor was his advice to keep behind the city walls rather than face the enemy in the field best calculated to rouse the Athenians' courage. The plague ravaged the city in 429, and in the autumn of the following year, Pericles himself died after a lingering fever. His two sons had been carried off by the plague; he had been harassed by a charge of peculation brought by Cleon, and the actual infestation of a fire by the diarrhea, while he had been without office from July 430 to July 429, but before the last he recovered his hold over the Ecclesia, and was gratified in the closing days of his life by the legitimation of his son by Aspasia.

As a statesman his greatest fault was a failure to foresee the ultimate ruinous to a nation. He taught the people to follow a leader, but he could not perpetuate a descent of leaders like himself. Hence we cannot wonder, when days of trouble broke over Athens, that men spoke bitterly of Pericles and all his glory. Yet he was a lofty statesman, inspired by noble aspirations, and his heart was full of a noble love for the city and her citizens. Plutarch tells the story that as he lay dying and apparently unconscious his friends around his bed were passing lighted torches over his great achievements of his life, and the nine truphies which he had reeived at different times for so many victories. The dying patriot quietly interrupted with the characteristic sentence—"What you praise in my life belongs partly to good fortune, and is, at best, common to me with many generals. But that of which I am proudest you have left unnoticed—no Athenian has ever put on mourning through any act of mine."

For his life and character, see Thucydides and Plutarch; the histories of Greece edited in 1817 by W. Watkin; the excellent study by Evelyn Abbott in the 'Heroes of the Nations' series (1891).

**Periplus.** See IGNOUS ROCKS.

**Perier.** CASIMIR, French politician, was born at Grenoble, 21st October 1777. A Parisian banker, he was minister in 1817 under the policy of the ministry, and thereby won a seat in the Chamber of Deputies. In 1828 he held the portfolio of finance under Martignac, but resigned it in August of the next year. Having taken an active part in the July revolution (1830), he was rewarded with a seat in the cabinet, but without a portfolio. When, however, Laffitte became President of the Council (November 2), Perier undertook the presidency of the Chamber of Deputies. On 13th March 1831 he succeeded Laffitte as minister; he sternly repressed all attempts at revolution, and governed by the "juste milieu" policy. He died of cholera, 16th May 1832. For his son, see CASIMIR-PERIER.

**Perigee.** See MOON.

**Périgueux,** a town of France, formerly capital of Périgord, now in the department of Dordogne, and situated on the right bank of the Isle, a tributary of the Dordogne, 95 miles by rail NE. of Bordeaux. It consists of the ancient city, which is gloomy in aspect and has narrow streets, with numerous houses and other remains of medieval and Renaissance architecture, and the Puy St Front, which until 1269 was a separate and a rival town. The cathedral of St Front is a Byzantine edifice, said to be a copy of St Mark's at Venice, built in 894-1047, but spoilt by 'restoration' in 1865. The town museum is especially rich in Roman and other antiquities. Statues of Montaigne, Fénelon, and the soldiers Danneaus and Bugeaud adorn public places in the town. Iron is mined and worked, and woolens are manufactured. The central park is a "bois de Périgueux," made of par- tridges and truffles, are largely exported. Pop. (1801) 30,725. Périgueux, a town of the highest antiquity, is the Gallic Vesunna mentioned by Caesar. The Romans built another town on the opposite side of the river at the junction of five Roman roads. Cluny was founded in the following century, and remains of a vast amphitheatre, aqueducts, baths, and temples. The tower of Vesunna is the most remarkable fragment of Roman architecture. It is 80 feet high, 200 feet in circumference, and has walls 6 feet thick, but has neither doors nor windows. Its purpose is not known. The district of Périgord is noted for its Caves (q.v.) and archaeological finds. See FLINT IMPLEMENTS.

**Periation (Gr. peri, and hélio, 'the sun'), that point in its orbit at which a planet is nearest the sun. See PLANETS, ORBIT, APHELION.

**Perin.** a barren island, and coaling and telegraph station belonging to Britain, situated in the Strait of Бз-Ель-Мандеб, at the southern entrance to the Red Sea, 97 miles W. of Aden, 13 from the Arabian shore, and 9 from the African. It is about 33 miles long by 24 wide, and crescent shaped; the two horns embracing a deep and spacious harbour. The island was visited by the British in 1799-1800, and was again occupied in 1857. In 1857 it was made a coaling station, and soon began to be a rival to Aden. The island is under the jurisdiction of the governor of Bombay Presidency. Pop. about 400, mostly coolie cool- hearers. See H. Spallanzani, Perin as it is (1880).
Perinæum

Perinæum, the floor of the human pelvis. The anterior portion, situated in front of the anus, is called the true perinæum, or urethral portion of the perinæum; the posterior portion is called the anal portion or ischio-rectorial region.

Period and Periodicity. One of the most striking features of the ordinary phenomena of nature is their tendency to recur and repeat themselves in a similar manner indefinitely; and in general this repetition takes place at regular intervals and practically equal intervals of time. The day, the month, the year are familiar examples of such periods, corresponding respectively to the earth's rotation, the moon's phases, and the phases of the sun. As a factor in human life the year is especially traced out by the climatic changes that accompany its progress, but strictly speaking it is the period determined by the recurring configurations of earth and sun. Many periodic phenomena of importance, such as eclipses, transits, occultations, depend on the moon's phases on the one hand; and long before Newton's law of gravitation gave the key to the cosmic universe the periods of some of these had been discovered. See ECLIPSE (with its various cycles—the metonic period of 19 years, the Saros period of 76 years, &c.), CYCLE, DAY, ECLIPSES, YEAR, &c.

When we look into the minute mechanism of nature we find here also the same prominence attached to periodic qualities. Sound and light may be classed as a vibratory or oscillatory motion of some sort; and an accurate time periodicity of these motions we trace our sensations of harmony in music and colour. In certain respects, however, the periodicity is imperfect, each period not being an exact reproduction of its predecessor. The tuning-fork or pianoforte-string vibrating freely in a perfectly lossless vibratory character, and its motion steadily damped by the air, is an exception, and yet, judged by the pitch, the frequency, or time periodicity remains the same throughout. In these similar cases viscosity (q.v.) ultimately transforms the vibratory energy into heat (see ENERGY). Heat itself is believed to be of the kind of vibratory energy of the molecules; and the spectroscope demonstrates that intense heat is certainly associated with definite periodic motions, giving rays of corresponding periodicity (see SPECTRUM).

Passing now to the other extreme, we find prominently in astronomy, instances of long periods, some of which have not been completed within historic times, but of which the evidence is incontrovertible. The recession (q.v.) of the equinoxes and the slow changes in the eccentricities and inclinations of planetary orbits may be mentioned by way of illustration. The geologist also has found evidence of periodic changes in the climatic situations of the earth (see GLACIAL PERIOD, PERIODICITY). Geomagnetic periodicity involves the idea of time, but we are not aware of the periodic qualities depending on position or on grouping. A very good example of this is the periodic law of modern chemistry (see ATOMIC UNITS, also WAVES).

Life is as full of periodic phenomena as animate nature; but the increasing complexity of conditions makes the periodicity still less perfect. In the beating of the heart, in the alternation of breathing and sleeping, of hunger and satiety, we have examples of vital actions with a distinct periodic character.

Periodicals. Everything is a periodical that is published periodically. Every publication that is published more than once is necessarily published periodically. Therefore every publication, excepting a book complete in itself, may, strictly speaking, be described as a periodical, from the Times to Whittaker's Almanac and the Post-office Directory. The use of the term is, however, restricted in ordinary conversation to magazine or reviews appearing not less frequently than once a quarter, and not more frequently than twice a month. Weeklies, at least in Great Britain, have with a few exceptions ceased to be regarded as periodicals. As we have no set of successive issues, our periodicals may be said to be practically reduced to monthlies and quarterlies.

The refusal of the English-speaking world to tolerate fortnightly publications is as remarkable as if it is unnatural. In France and Italy and Belgium the fortnightly is regarded as the natural form of the high-class periodical. Outside these countries the fortnightly is practically unknown. Neither in Great Britain, nor in Greater Britain, has it been found possible to acclimatise the fortnightly. In Russia, in Germany, in Scandinavia, and in Spain and Portugal the periodicals are monthly. As if to remind the world of the constitutional incapacity of the English race to take its literature in bimonthly instalments, the Fortnightly Review is published monthly, but religiously announces on every cover that the issue of the 15th is suspended.

The number of periodicals is almost numberless. There are 332 monthlies in Italy alone, of which, at a moderate computation, 300 are read by no one monthlies in Italy, and by probably fewer than 300 subscribers within the peninsula. But the number of periodicals of general interest that are worth reading or the periodicals are comparatively few. In Italy, for instance, there are hardly more than three which the outsider world ever heard of. In France there are not more than four or five. Different countries exceed in different departments. It is in the literature and criticism the Revue des Deux Mondes has the first place. For illustration America leads easily, distaining all rivals with the Century, Scribner's, Harper's; while in the second rank, although still ahead of foreign competitors, with one exception, come the Cosmopolite, the New Monthly, the Foreign Magazine. The only exception is the German magazine, Vehag en und Klaasen's Neue Monatshefte. For general interest and solidity combined the English periodicals and monthly miscellanies rank first, although they are habitually proselytised by the Nouvelle Revue, the North American Review, the Forum, and the Arena. For bulk the Russians surpass all the magazines and reviewers of the world. The Russian monthly contains about three times as much printed matter as the Nineteenth Century. In proportion to its size Belgium leads the world in the multiplicity of its periodicals; but their prosperity is in an inverse proportion to their numbers. There is only one Portuguese monthly procurable in London.

The genesis of the periodical can be traced back for centuries, but the earlier publications of the kind bear about as much resemblance to the magazines and reviews of to-day that the colliery bears to the winner of last year's Derby. The evolution of the modern magazine is usually traced back to the Philosophical Transactions of the Royal Society, which began to appear in 1665, but the true progenitor of our monthly miscellanies were the pamphlets which were spawned in such numbers in the heat of the revolutionary ferment of the 17th century. There was no regular periodicity in their appearance. Pamphleteers wrote as the spirit moved them, but their intermittent productions, in everything excepting the regularity of their appearance and the fact that each appeared singularly instead of being stitiched together with a dozen others, correspond very closely to the
monthly miscellanies which have now become the forum of civilisation. Milton, Marvell, and Defoe
would all have been regular contributors to our
monthly miscellanies. The editorship of these publications had existed in their
time. As they were without those con-
veniences of a more complex civilisation they were
under the necessity of publishing each of their
effects separately, often at their own risk, and very
seldom to their own profit. In its last and depri-
mant stage the middleman has been found indispensable alike for the profit of the
producer and the convenience of consumers.
The modern review is the monthly market where
author sells their wares, and of late the excessive
multiplication of weekly journals has led to the publica-
tion of a kind of clearing-house of periodical litera-
ture in the Review of Reviews in London and New
The history of periodical literature in the 18th century as usually told in encyclopedias is little
better than a parade of epistles from the tombs of defunct reviews. Two notable facts, however,
stand out clearly discernible on these sepulchral tablets. The first, the literary position
achieved for the first time to periodical publications by Addison's editorship of the Spectator, although
it was no less than seven months that the impres-
sion, the first monthly magazine of the modern type, when Cave the pub-
lisher brought out the Gentleman's Magazine in 1731.
Of the Weekly Memorials for the Ingenious,
published for twelve months in 1748, or the Gentle-
man's Journal, a Monthly Miscellany which appeared in 1792, nothing need be said. The
Gentleman's Magazine, after making a fortune for
its originator, has continued to flourish ever since.
If England may claim the honour of having in-
volved, with the assistance of Sydney Smith and a
few less gifted Southern, decided to establish the
Edinburgh Review (q.v.) in Whig interest in 1802. Their enterprise was rewarded by an in-
mediate and signal success. The wit, the talent, the
audacity, and the sheer impudence of the young
reviewers startled the limited world of letters from
centre to circumference, and convinced the Tories in
Scotland that it was impossible to counter the blue and yellow organ of
militant Whigerry by a quarterly of unimpeach-
able orthodoxy. Thus it was that of the Edin-
burgh was born the Quarterly (q.v.), and the
two great periodicals have held the field ever since as the
most authoritative exponents of the most respect-
able and scholarly element of the two great parties.
The honour of initiative in these matters was not
confined to the Scottish Whigs. Fifteen years after
the Edinburgh first made its appearance a Scottish
journal on the other side, William Blackwood by
name, achieved fame and fortune by an unqualifiedly
happy stroke in the publication of Blackwood's
Magazine, a half-crown monthly which may be
regarded as the parent of the political monthly
miscellany. Blackwood was to the Edinburgh and
the Quarterly what the breeze was to the stately
drake. It appeared twelve times yearly, against their four numbers; it was infinitely
more varied. It published serial fiction, poetry,
prose, and that marvellous symposium, the Notes
and Queries, a secret of which perished with
the author, Christopher North. This was again expelled by
the other side to resort to the publication of periodicals which
are for the most part not only dead, but for-
gotten. The post Campbell did his best in Col-
burn's Monthly, but for a dozen years the ascendency of the
torrential but brilliant Meg was undisputed.
Then in 1830 came Fraser—a magazine which,
then in many visits under many editors, is now
acknowledged as in other parts of Great Britain
brutally tulipulent in its Toryism than of yore, but
still bright, brilliant, and scholarly.
The Scottish initiative so remarkably asserted in the
Edinburgh among the quarterlies and Black-
wood among the monthlies was not exhausted. In 1832
the New Monthly Journal was, and in 1850,
marking the commencement of a new and more
popular phase of magazinedom. It was published
weekly, but was also issued in monthly parts.
More than half a century has passed, and Chambers
is still 'familiar in our monthlies as housewords,'
Cassells' Family paper (now known as The
Family Magazine) was not started till 1833. The
old Penny Magazine (1829), published by the Society
for the Diffusion of Useful Knowledge, deserves
honourable mention. It was succeeded by the
Leisure Hour in 1852, still one of the best illus-
trated Expendtes, published by the Religious Tract
Society. Charles Dickens founded Household
Words in 1850, and All the Year Round in 1859.
In 1859 Macmillan—again a Scott—published the
first shilling magazine. This new departure was
rapidly followed by the publication of monthly
under the editorship of William Thackeray, which at once
achieved a phenomenal success; of Temple Bar,
edited by George Augustus Sala; and of London
Society, which has always relied chiefly upon fiction
for its circulation. In 1855 George Henry Lewes founded the Fort-
nightly Review, an avowed imitation of the Revue des
Deux Mondes. It was started as a medium for the dis-
cussion of subjects which interest cultivated and
thoughtful readers, and it was to be published at
intervals 'neither too distant for influence on
passing questions, nor too brief for deliberation.'
Mr Lewes was soon succeeded by Mr John Morley,
who, in the sixteen years during which he was editor,
gave a distinctive character to the new periodical
literature of our time. The success of the Fortnightly
led to the publication of the Contemporary (1866),
the rival paper to the Fortnightly, and the two
together were called the 'battle of the Press,' as the
Fortnightly was biased in favour of Anac-
ticism. This again was followed eleven years later
by the publication of the Nineteenth Century, a miscel-
Ilaney entirely free from editorial bias of any kind.
These three reviews have a practical monopoly of the
field. They claim as neighbors or rivals
—they can hardly be described as either rivals or
competitors—the National Review (1833), which is
Conservative; and the Westminster, which, origin-
ally founded in 1824 as a quarterly, was converted
in 1887 into a monthly, while still remaining true
to its original philosophical Radical principles.
All these are published at half a crown. Most of
them publish both signed and unsigned articles—
the Nineteenth Century alone has consistently
refused to insert any article not signed by the real
name of the author. The circulation of the Nin-
teenth Century does not quite reach the half-
crown review with more than 12,000 subscribers.
In 1850 the Monthly Packet was founded by
Miss Yonge; it is written for young girls.
Another Church of England shilling magazine was the
Newbury House Magazine, issued from 1839
onwards. The New London Magazine was
founded in 1844. In 1869 Good Words, founded by Mr Stahan, under the editorship of Dr
Norman Macleod, achieved so great a success as a sixpenny monthly, that it was followed in
1864 by the publication of the Sunday Magazine,
edited by Dr Guthrie. The prosperity of the six-
penny led to the extinction of some of the older
magazines. The English Illustrated Magazine,
started in 1833, has repeatedly changed its manage-
ment.
sixpence. In the years 1887-89 Murray's Magazine appeared at a shilling. In 1900 the Review of Reviews appeared at sixpence, followed in 1891 by the Strand Magazine. These magazines achieved in the first year of their publication circulations exceeding 100,000. The Idler, at first (1892) a sixpenny, now costs a shilling; the Poll Mall Magazine dates from 1893; the Woman at Home from 1894; the Windsor began in 1895. Crampton's (now Chapman's) Magazine is devoted to short stories; McClure's Magazine began in 1893; Cassier's Magazine (1891) concerns itself with industry. In 1898 Sir G. Newnes started The Wide World Magazine and The Home Magazine. The most widely circulated magazines, besides the Strand, Chambers's Journal, and Pearson's, are Harmsworth's, Royal Magazine, The Puritan, Boy's Own Paper, Girl's Own Paper, Quiver, Cassell's Family Magazine, The Young Man, The Young Woman, Leisure Hour, Sunday at Home, Good Words, and Sunday Magazine.

Among monthly periodicals devoted to art the chief is the Art Journal (1839). The Portfolio, founded by Mr Hamerton in 1869, is since 1894 a series of monographs on artists. The Magazine of Art (1878), The Artist, and The Studio are well known. Music is represented by the Musical Times and a few others, and the drama by the Theatre Review.

The geographical societies publish their proceedings, and most of the sciences have their own reviews; the National Review has a line of its own. The English Historical Review and The Scottish Review (1889) fulfill special functions. Cosmopolis (1884) is a magazine for the young, and there are innumerable religious magazines. The Catholic Church is represented by the Dublin Review (quarterly), the Month, the Lamps, the Lyceum, and St Peter's (1898). The Wesleyan Methodists and the Primitives publish quarterly; the Congregationalists have no longer the place in periodical literature they possessed when Mr Allen edited the British Quarterly and Yaxton Hool the Eclectic. The Jewish Quarterly is read by many who are not Jews. The Salvation Army has a monthly that is the War Cry. The largest is devoted to sport. There are monthly magazines devoted to astrology, postage-stamps, chess, cricket, cycling, vegetarianism, anti-vaccination, Malthusianism, spiritualism, theosophy, and mysterious psychical phenomena; and most trades have a periodical devoted to their interests.—Santa Lucia is the monthly for the blind, in raised Braille type. See Blue-Books.

A general idea prevails among the public that to write for the magazines is a sure and easy road to fame and wealth. Any one, except writers of popular fiction, the number of contributors to periodical literature, not holding editorial appointments, who make £200 a year out of the magazines might probably be counted upon the fingers of one hand. The best paid contributors to magazine reviews are other contributors. The average cost of a page of five hundred words is £1 a page of 500 words. The average review article does not yield its writer more than £15. As there are not ten men in England who contribute ten articles each a year to monthly miscellanies—the contemporary periodical—the total number of contributions rises ever higher. The late editor of the Forum recently calculated that he received from outsiders 3000 MSS. per annum, out of which he was usually able to use less than one per cent. 'Wham's the harm,' asked the Ettrick Shepherd in Noctes, 'o a few gude, sober, steady, judicious, regular, well-informed, versateele, and biddable contributors?' To this inquiry Christopher North replied, 'None such are to be found on earth—you must look for them in previous ages.' It would seem that the editorial burden has changed little in fifty years. Poetry in particular is a drug in the market. In the same Noctes Christopher North said, 'I seldom pay for poetry. In cases of charity and courtesy—that is to say of old women and young ones—by terms are arranged. A shilling, a sonnet, a dollar for a dramatic scene, and for a single book of an epic by way of a specimen, why, I do not grudge a sovereign.' This is probably more than the epic poet of our day would get for all his books from any magazine editor. Many periodicals, like hospitals, are supported entirely by voluntary contributions.

Of English-speaking lands the periodical flourishes chiefly in the United States. In the British colonies the English product seems to kill out the native productions. Beyond the very noteworthy periodical quarter in Sydney, and some diminutive religious magazines, Australia has no monthly magazines or reviews, except the quarterly Imperial Review of Melbourne. New Zealand has the Monthly Review. South Africa has produced no magazine of national pretensions; what had in the Bystander a unique magazine edited, written, and owned by Mr Goldwin Smith, but it no longer appears. Barbadoes has a little monthly in Exselsior; Honduras boasts the Hondurass Mining Journal, formerly Honduras Progress; and British Guiana publishes Timehri, a quarterly. Among the periodicals in English published on the Continent are the Enquiltine (Rome) and Anglo-Austria (Meran). India has the Calcutta Review (quarterly), and the monthlies, the Indian National Magazine, the Indian Magazine and Review, and the new Allahabad Review; but the publications of London and Edinburgh overshadow the periodicals of the rest of the empire. The Asiatic Quarterly now embraces colonial and African topics, otherwise the colonies are not excepted as by the daily mail. Among the periodically issued printed matter is conveyed by the mails at special rates not exceeding a halfpenny per pound. In England it costs 2½d. to send a half pound of printed matter, if published monthly, through the post from St. Martin's-le-Grande to Downing Street—although the post-office will carry a pound weight of printed matter if it is issued weekly for one halfpenny from Land's End to John o' Groats. This absurd method of handicapping monthly publications is unknown in the United States. The American periodical is distinguished for the excellence of their typography, and the clearness and artistic character of their illustrations. There are no such illustrated magazines as the Century, Scribner, and Harper published outside of New York. Munsey's (ten cents) has a circulation of 250,000. The American illustrated magazine is found throughout the British empire; the Century and Harper circulate largely in India. The Cosmopolitan has now begun to publish in London as well as in New York. The New England Magazine is also a well-illustrated monthly. Of the non-illustrated American magazines the Atlantic Monthly (1858) is one of the oldest and most respectable. Lippincott publishes monthly a complete novel of high character, with a selection of miscellaneous essays. All these are now
published simultaneously in London and New York. The three monthly reviews which correspond to the Nineteenth Century, Fortnightly, and Contemporary are the North American (1815), the Forum (1886), and the Arena (1888). The Arena accompanies its letterpress with portraits and occasional illustrations. It has a distinctive rôle of its own, being the arena for the free development of all the issues which seem to foreshadow the trend of progress. The Forum is steady, sensible, and instructive. The North American is more lively and up to date. All these publish signed articles. The Arena publishes stories. English writers contribute largely to the North American and the Forum. In theology there are the Anrioler Review, Homiletic Review, Church Review, American Catholic Quarterly, Catholic World, &c.

Up to 1891 some of the English reviews were in the habit of forwarding printed sheets to New York every month; but in order to get knowledge of the American reader concerning English periodicals has been gained from the pages of Little's Living Age and Current Literature, two publications which are freely fed from the pages of English magazines and reviews. The Americans produce copiously the most intelligent and the most numerous quarterly. They publish great on economics and education, and theology of the slightly antiquated pattern. Their Popular Science Monthly is one of the best of its kind, and the Chautauquan is quite unique—a magazine that might almost serve for a university.

Coming to foreign periodicals, the first place naturally belongs to France, whose two principal reviews, the Revue des Deux Mondes (1829) and the Revue de Revue (1879), are read throughout the whole Latin world. It is a curious fact that the Revue des Deux Mondes has more subscribers outside France than within the republic. There is a great Latin belt of a French reading public stretching from Madrid to Bucharest, and among them the Revue reigns as it has long reigned supreme. The Nouvelle Revue over its career has been more than a ribald for a university.

Coming to foreign periodicals, the first place naturally belongs to France, whose two principal reviews, the Revue des Deux Mondes (1829) and the Revue de Revue (1879), are read throughout the whole Latin world. It is a curious fact that the Revue des Deux Mondes has more subscribers outside France than within the republic. There is a great Latin belt of a French reading public stretching from Madrid to Bucharest, and among them the Revue reigns as it has long reigned supreme. The Nouvelle Revue over its career has been more than a ribald for a university.

Coming to foreign periodicals, the first place naturally belongs to France, whose two principal reviews, the Revue des Deux Mondes (1829) and the Revue de Revue (1879), are read throughout the whole Latin world. It is a curious fact that the Revue des Deux Mondes has more subscribers outside France than within the republic. There is a great Latin belt of a French reading public stretching from Madrid to Bucharest, and among them the Revue reigns as it has long reigned supreme. The Nouvelle Revue over its career has been more than a ribald for a university.

Germany has many literary capitals, and her magazines do not all emanate from a single centre. Most of the popular German magazines, such as Die Gartenlaube and Uber Land und Meer, are issued both weekly and monthly. They are copiously illustrated, and form a great contrast in their readableness to such ponderous reviews as the Deutsche Rundschau, the Deutsche Revue, Uner Zeit, and the Preussische Jahrbcher. Among the illustrated popular magazines, Tom Pobel zum Meer deserves a high place. The best of the German magazines is Schlegel's Klassiker's Neues Monatshefte, already mentioned, Westermann's Deutsche Illustrirte Monatshefte and Nord und Sud are also high-class magazines. German periodical literature is very rich in the original reviews, and several periodicals represent the various new schools of literature—e.g., the Gesellschaft is the organ of the Realists. Similarly the Moderne Rundschau, the Deutsche Dichtung, and others are conducted by members of the new schools and the old.

In Russia the weekly review forms the chief field for the manifestation of the literary talent of the nation. These reviews are published either at Moscow or at St. Petersburg. They are hardly seen outside Russia; they are not illustrated, and their circulation is comparatively small. In Italy the Nuova Antologia, La Rassegna Nazionale, and La Civiltà Cattolica are the only periodicals excepting those purely scientific or professional that are seen outside the peninsula. Spain has Espafia Moderna or Revista Ibero-Americana and Revista Contemporanea; Holland, De Gids, Vragen des Tijds, and Elsevier's Geistlirdre Maandschrift; Scandinavia, Tidsvaren, Svensk Tidskrift, Nordisk Tidskrift, &c.

In concluding this rapid survey of the periodical literature of the world, mention should be made of the latest born and most polyglot of monthlies, the Pantobiblon, a magazine published in St. Petersburg in no fewer than fifteen different languages. It aims at providing professional and scientific men of all countries with a clue to the periodical literature, technical and scientific, of all the world. It is like a periodical monument reared to the memory of the Tower of Babel.

Pouk's Index to Periodical Literature, a dictionary of the more important articles in the quarterlies, monthlies, and many weeklies, is edited by a Chicago librarian. Stead's popular Index to the Periodicals of 1890 has been issued in London, and the publication is to be continued annually. See also the articles Newspaper and Book Trade in this Dictionary.

Periopathamnus, a remarkable genus of acanthopterous fishes, allied to the gobies. Their eyes protrude and are very mobile; their pectoral fins can be used as legs. Several species occur on the coasts of the Indian Ocean and Western Africa; of these the best known is P. koelreuteri.

(From Hékson's Naturalist in North Celebes, 1890.)

This fish lives about low tide-mark on the muddy flats or among rocks, and by means of its pectoral fins and tail flaps along in search of crustaceans, insects, and gastropods. Respiration seems to be effected through the skin of the tail even more than by the gills. They cling by their fins to rocks and mangrove-roots, and keep their tails in the water; or they climb entirely out of the water, and jump with agility when disturbed.

Periopathitis, inflammation of the periostracum, the tough fibrous membrane which surrounds the various bones (see Bone). It generally occurs on the surface of thinly-covered bones, such as the tibia, clavicles, and cranial bones. Its chief causes are (1) a syphilitic taint; (2) rheumatism; and (3) serpula; but its occurrence is often determined by injury to the part. The affection, especially when due to the first or second of the above causes, is usually accompanied with considerable nocturnal pain. If the disease occurs in an acute form it must be treated with leeches, fomentations, and other ordinary antiphlogistic remedies. If severe, an incision through the inflamed tissue is sometimes the most effectual treatment.
Peripatetic Philosophy, a designation of the philosophy of Aristotle (q.v.) and of his followers. It is of doubtful origin, being supposed to have been derived either from his custom of occasionally walking about (peripatein) during the delivery of his lectures, or from the habit in which they were delivered being a shaded walk.

Peripatus, a genus occupying a unique position between myriopods and insects on the one hand and annelids on the other. For, along with the tracheae or air-tubes characteristic of insects, Peripatus has the nephridia or excretory tubes characteristic of annelids or earth-worms. The body measures about two inches in length, is shaped like that of a worm or caterpillar, but without external rings, bears numerous (14 to 124) imperfectly-jointed stump-like clawed feet, and has a soft skin, with little if that chitin which is abundant as a cuticular product in other arthropods. The head bears a pair of mobile antennae, a pair of mandibles in the mouth, and a pair of oral papillae from which slime oozes. With this Peripatus catches its prey of small insects, &c. The species live in moist places, and their habits are nocturnal in their habits. Professor Sedgwick says that it is the exquisite sensiteness and constantly changing form of the antennae, the well-rounded plump body, the eyes set like small diamonds on the side of the head, the delicate feet, and, above all, the rich colors and form with a child-like simplicity, are peculiar machine to give these animals an aspect quite exceptional beauty. There are many remarkable structural features: thus, the ventral nerves are widely separate; the eyes are simple, like those of an annelid; the body-cavity is divided into three longitudinal compartments, from which the cavities of the legs are furthermore distinct. The sexes are separate. The development varies considerably in different species, for the ova may contain a considerable amount of yolk or none at all. In several it has been observed that the cells of the embryos are for a prolonged period indistinctly separate from one another. The embryos develop within the body of the mother-animals; when born they resemble the parents except in size. The distribution is very wide; in South America four species, *P. caurinus, P. baffouri;* in New Zealand, *P.* *zoutendamia;* in Queensland, *P. lewiskii;* in Caracas, *P. edwardii;* and others from Demerara, Trinidad, St. Vincent, Chili, Quito, &c. The distribution, the structure, and the development of Peripatus all suggest that it is the survivor of an archaic type. The genus is usually dignified as a special class of Arthropods—Prototrichaeta. See figure under CATERPILLAR; and monograph by A. Sedgwick, Quart. Journ. Micr. Soc., xxviii. (1888).

Perissodactyla. See ARTIODACTYLA.

Peristaltic Motion, the action of the muscular coat of the intestines, by which the substances contained within it are regularly moved onward. See DIGESTION.

Peritonenum (Gr. peritonein, 'to extend around'), a serous membrane, and, like all membranes of this class, a slht sac, which, however, in the female is not completely closed, as the Fallopian tubes communicate with it by their free extremities. The peritonenum more or less completely invests the organs lying in the abdominal and pelvic cavities, and is reflected upon the walls of the abdomen, so that there is a visceral and a parietal layer. Numerous folds are formed by the visceral layer as it passes from one organ to another, giving rise to the parietal layer, and at the same time enclose vessels and nerves. Some of these folds are termed Ligaments, from their serving to support the organs. Thus we have ligaments of the liver, spleen, bladder, and uterum formed by peritoneal folds. Others are termed Mesenteries (from the Gr. meso, 'the middle,' and enteron, 'the intestine'), and connect the intestines with the vertebral column. They are the Mesentery proper, the ascending transverse, and descending meso-colon, &c. In the peritonenum, there are folds called Omenta, which proceed from one viscus to another. The great omentum always contains some adipose tissue, which in persons inclined to corpulency often accumulates to an enormous extent. Its use appears to be (1) to protect the bowels from infections, (2) to prevent the abdomen from being divided anteriorly as with an apron, and (2) to facilitate their movement upon each other during their vermicular action.

DISEASES OF THE PERITONEUM.—The peritonenum often becomes the seat of topical effusion, both in cases of general dropsy and in circumanthesis of the liver. It may also be attacked by cancer, either primary or secondary, and, like all the serous membranes, readily takes on inflammation from various exciting causes. This inflammation is termed Peritonitis, and may be either an acute or a chronic disease.

Acute Peritonitis, inflammation of the coating of the bowels, but often popularly spoken of as 'inflammation of the bowels,' generally presents well-marked symptoms. It sometimes commences without any pain in the abdomen is usually the first symptom. The pain is at first sometimes confined to particular spots (usually in the lower part of the abdomen), but it soon extends over the whole abdominal region. It is increased, on pressure, to such an extent that the patient cannot even bear the weight of the bedclothes; and to avoid, as far as possible, internal pressure upon the peritonenum, he lies perfectly still, on his back, with the legs drawn up, and breathes by means of the ribs, in consequence of the pain occasioned by the descent of the diaphragm. In inspiration. The breathing is naturally shallow in these cases, and, less air being admitted at each movement of respiration, the number of those movements is increased. There are perhaps forty or even sixty respirations executed in a minute, and the temperatute. The pulse is usually very frequence, often 120 or more; almost in the minute, and small and tense, though occasionally strong and full at the commencement of the attack; the temperature is usually raised, and vomiting is almost always an early symptom. After the disease has continued for a time, the belly becomes tense and swollen; the enlargement being caused at first by flatus, and afterwards also by the effusion of fluid, as may be ascertained by percussion and palpation. The progress of the disease is in general rapid. If fatal cases death usually takes place within a week, and often sooner. The symptoms indicating that the disease is advancing towards a fatal termination are great distention of the abdomen, a very frequent and feeble pulse, a pinched and extremely anxious appearance of the face, and cold sweats. Peritonitis rarely arises from exposure to cold alone. It is frequently the result of local violence, and of wounds penetrating the peritoneal sac, including various surgical operations. In the majority of cases it is due to extension of some inflammatory process, situated in the abdominal viscera, particularly the hollow viscera (stomach, intestines, gall-bladder, urinary-bladder, womb). It is sometimes caused by Bright's disease. Two varieties call for special mention: purperal peritonenum, due to the inflammatory inflammation of the lining membrane of the womb after child-birth or miscarriage, a most fatal form of disease; and peritonitis from perforation of one of the hollow
vessels, which is characterised by the suddenness of the attack, intense pain, incapable of mitigation by medicine, all at once arising in some part of the abdomen, the whole of which soon becomes tender in every part. This form of the disease is generally fatal, death usually ensuing within two days. In some, after which, there is vomiting for a few hours. Perforation of the small intestine, in consequence of ulceration of its glands, is of not uncommon occurrence in typhoid fever, and sometimes occurs in phthisis. That apparently useless structure, the vermiform appendage of the caecum, is the peculiar organ of perforation; sometimes it is the stomach which is perforated, and in these cases the patients are usually unmarried women (especially domestic servants), who may have previously appeared in good health, or at most have complained of slight dyspepsia.

At the onset of the disease it is not always easy to distinguish it from Colic (q.v.), but the progress of the case will soon settle the question. With this exception, the only disease with which peritonitis is likely to be confounded by the well-educated practitioner is a peculiar form of hysteria; but even in this case the presence of hysteria in other forms, and the general history of the patient and of her symptoms will almost always lead to a correct diagnosis of the disease.

The treatment of a case of peritonitis must depend upon the nature of the case, and in all it is of the greatest importance to keep the bowels at rest. But in some, particularly those following surgical operations on the female generative organs, the opposite plan, treatment by saline purgatives, intrinsically by Lavage. Taint, gives excellent results. The diet must be light and fluid; in cases of perforation of the stomach, no food or even drink must be given by the mouth. Light poultices, or hot fomentations, should be constantly applied to the abdomen; leeches are sometimes useful. In cases of perforation from disease or injury, and of supplicative peritonitis, life has frequently been saved during recent years by prompt surgical interference.

Chronic Peritonitis occurs in two forms, which differ widely as to their symptoms and mode of treatment, and yet are very similar in their symptoms. In the first the inflammation is of the ordinary character, and, although the disease sometimes originates spontaneously, it is more frequently the sequel of an imperfect cure of acute attack; in the second it depends upon tubercular inflammation, and it generally meets with in persons of a scrofulous constitution. The symptoms of chronic peritonitis are more obscure than those of the acute form. There is abdominal pain, often slight, and not always constant, which is increased by pressure, or sometimes felt only when pressure is made. The patient complains of a sensation of fullness and tension of the belly, although its size is not visibly increased; of a loss of appetite; and of nausea and vomiting; and the bowels are usually more or less out of order. After leaving the abdomen enlarges, and becomes tympanitic, and the ascitic fluid is elevated; and death gradually ensues from delirium and emaciation, unless the fatal issue is accelerated by an acute inflammatory attack. It is not always easy to determine, during life, whether the disease belongs to the first or second. When its origin cannot be traced to a preceding acute attack to local abdominal injury, or to chronic affections of the abdominal viscera, there is strong reason to believe it to be of the tubercular form, especially if the disease is of a constitutional nature. In the tubercular form of the disease, the tenden- cees of the patient point in the opposite direction.

Little can be done in the way of medical treatment, especially in the tubercular form, further than mitigating the most distressing symptoms, and possibly retarding the final issue, though recovery sometimes follows the continuous application of mercurial liniment. In chronic, even tuber- cular peritonitis, however, as in the acute disease, surgical interference, either by aspiration or by free opening of the abdomen is late, has given very encouraging results in many cases.

Periwinkle (Vinca), a genus of plants of the natural order Apocynaceae, having a 5-clawed calyx, and a saucer-shaped corolla bearded at the throat, with five obliquely truncated segments. The leaves are opposite and evergreen; the flowers grow singly in pairs near the axis of the stem. The Lesser Periwinkle (V. minor), a native of many parts of Europe and of the southern parts of Britain, growing in woods and thickets, is a half-shrubby plant with trailing stems, rooting at their extremities, ovato-lanceolate leaves, and pale-blue—sometimes white or reddish-purple—salver-shaped flowers. The Greater Periwinkle (V. major), which has much larger flowers and ovato-cordate leaves, is a native of the south of Europe, and is found in a few places in the south of England. Both of these species are very commonly planted as garden plants, usually being grown in gardens objects with pleasing green foliage, and producing their beautiful flowers at almost all seasons of the year, even in winter when the weather is mild. The Herbaceous Periwinkle (V. herbacea), a Hun- garian species, is remarkable for the abundance of its flowers. The Yellow Periwinkle (Vinca major) is a native of the southern parts of North America. The Rose-coloured Periwinkle (V. rosea), a native of Madagascar, is a favourite hothouse plant.

Periwinkle (Littorina), a genus of marine Gastropods, represented by several species on British coasts. The commonest, Littorina littorea, is abundant between tide-marks on the rocks, and is often collected and used for food. It is hatched in its shell, extracted as eaten, and is very palatable. Periwinkles crawl about under water, but usually remain passive when left uncovered by the tide. Without water they can survive for many hours, and then become unable to endure a considerable freshening of the salt water. They are very abundant in seaweeds, and are often useful in keeping beds of young oysters from being smothered. Periwinkles drawn up from 70 to 80 fathoms were first in 1889 used as bait for cod-fishing on the banks of New- foundland. The little white species is orpinous, but in the larger species it is usually thrown from the water mark, the young are hatched and have a hard shell before they leave the mother. These shells are apt to make this periwinkle gritty, and therefore it is not used as food. Among the struc- tural characters of the periwinkle the substantial shell of few whors, the closely-fitting, horny oper- culum, the nearly circular shell aperture without any siphon-notches are at once evident. Species of Littorina occur on almost all coasts, and there are about half a hundred in all. It should be care- fully noticed that, in the periwinkle, the periwinkle becomes the shell of the fish, when the fish is caught, and the shell is thrown off. The shell is then often called the Wilk, Wulk, or Whelk in Scotland, but it is not nearly related to the true whirls (Purpura, Bucephum, &c.). See WHELK.


Perjury is the crime committed by one who, when giving evidence on oath as a witness in a court of justice, before some competent authority of the same kind, gives evidence which he knows to be false. But in order to make the giving of false evidence a crime the evidence must be ma- terial—i.e. it must affect the decision of some question before the court. If the falsehood occurred as to some trivial or immaterial fact no crime is
committed. Moreover, it is necessary, in proving the crime, that at least two persons should be able to testify to the falsehood of the matter, so that there must be a majority of oaths on the matter; there being then two oaths to one. But this rule is satisfied though both witnesses do not testify to one point. The perjury must also have taken place before some court or tribunal which had power to administer the oath (see OATH). Though in some courts affirmations are allowed instead of oaths, yet the punishment for false affirmation is made precisely the same as for false swearing. The punishment for perjury was, before the Conquest, sometimes death or cutting out the tongue; perjury is now a misdemeanour, punishable by imprisonment with hard labour. The crime of Suborning of Perjury—i.e. the persuading or procuring a person to give false evidence—is also punishable as a distinct offence; if the false evidence is not given the crime is incitement. In many states of the American Union the crime of perjury by law, is further particularly defined by statute. The violation of an oath of office is not perjury; nor is a false affidavit to an account rendered to an administrator technically perjury, nor false evidence in depositions taken by consent by unauthorised persons.

Perkeniers. — MOLECCAS.

Petersburg, a town of the Prussian province of Brandenburg, 80 miles NW. of Berlin. Pop. 7825.

Perlitic Structure, in Petrography, is a structure seen in some vitreous rocks. These rocks seem as if made up of little pearly or enamel-like spheroids, each of which is subdivided into a number of concentric coats by curved cracks, running parallel to the surface, and the spheroids usually lie packed between rectilinear or curved fissures that traverse the rock in all directions. Perlitic is the name given to rocks showing this structure.

Perm, a town of Russia, on the Kama, by which it is 685 miles N.E. of Kazan. It is the chief seat of the extensive tracts of forest between European Russia and Siberia, and has a cathedral, tanneries, distilleries, flour-mills, and oil-works, and a government arsenal and cannon-foundry. Pop. 45,403. The government has an area of 123,314 sq. m. and a pop. (1897) of 3,963,298, and is constituted of 15 districts.

Permian System. In British this series of strata rests unconformably upon the Carboniferous rocks. It consists of the following groups:

Upper Red Sandstones, clay and silt (50 to 100 feet thick in east of England; west of Pennine chain, 600 feet thick).

Magnesian Limestone (500 to 600 feet): Zechstein of Germany.

Mort Slate (about 60 feet) = Kupferschiefer.

Lower Red and Mottled Sandstones, with conglomerates and breccias (3000 feet at Cumberland; in the east of England not over 250 feet) = Rothliegende of Germany.

The Lower Red Sandstones are greatly developed in Staffordshire, Cheshire, and Lancashire, and the Vale of Eden in Westmorland and Cumberland. Small areas also occur in the valleys of the Nith and Annan and in Ayrshire; and similar areas occur in the Scottish area the rocks extend to Arran in Ireland. The breccias met with in this group often contain erratics, and have the general aspect of glacial accumulations; and Sir A. Ramsay thought they probably indicated the occurrence of a glacial episode in the Permian period. In the Scottish area the rocks contain sheets of lava-form rocks and tuffs, associated with which are many small filled-up volcanic vents or necks. The most important member of the overlying groups is the Magnesian limestone, which is the chief repository of Permian fossils. Many of

its beds assume curious concretionary forms, as is well seen on the coast of Durham.

In Germany the Permian consists of an upper and lower group, the lower of which is often divided into the Zechstein and Kupferschiefer forming the upper, and the Rothliegende the lower group. Volcanic rocks are associated with the latter. The Kupferschiefer has long been famous for its ores of copper and other metals, and fossil fishes; while the Zechstein is associated with the representation of many undoubted Dinosaurs—the Zechstein and Kupferschiefer forming the upper, and the Rothliegende the lower group. Volcanic rocks are associated with the latter. The Kupferschiefer has long been famous for its ores of copper and other metals, and fossil fishes; while the Zechstein is associated with the representation of many undoubted Dinosaurs. In Russia the system occupies an area of more than 15,000 sq. m. between Moscow and the Urals. It is well developed in the government of Perm, from which it derives its name. While the German Dinosaurs presents the same general features as the Permian of Durham and the east of England, the Russian development resembles the Permians of the Midlands and north-west of England—limestone being quite a subordinate formation, and often wanting. Although there is considerable rockiness, especially the Permian and the Carboniferous, yet in some places, as at Antun in the heart of France, a conformable passage is traced from the coal-measures into the Permian. The same is the case in North America, where in the western part of that continent no hard and fast line can be drawn between the two systems—the Carboniferous gradually upwards into the Permian.

Life of the Period.—The Permian strata as a whole are not rich in fossils—the red sandstones which form so large a portion of the system being for the most part barren. A characteristic of the flora of the Carboniferous period that of the Permian is poor and meagre. But that poverty may be only apparent—the conditions for its preservation not having been so favourable as during Carboniferous times. But it is an important continuation of the Carboniferous flora. The most common plants are ferns—both herbaceous and arborescent—many of the genera being Carboniferous, while others, such as Callipteris, are not known as Carboniferous forms. Conifers were likewise numerous, especially the yew-like Walchia and the cone-bearing Ullmannia. Traces of what some suppose to have been eyecasts (Noggerathia) are met with in Permian strata. Finally, it may be noted that many characteristic Paleozoic types died out in Permian times, such as the Lepidodendrons, Sphenopsids, and Cartilaginous Fishes. The animal life of the period is somewhat better represented; but it too appears impoverished when contrasted with that which flourished in the preceding Carboniferous period. We note that rugose corals, so abundant in the older Paleozoic rocks, are very sparingly met with in Permian strata; even tabulate forms are feebly represented. Polyzoas are fairly numerous in the Magnesian limestone. Amongst brachiopods the more abundant types are survivivals from the Carboniferous, as Producta, Spirifer, Strophomena, and others. Lamellibranchs are somewhat more numerous than brachiopods, common forms being Schizodus, Bakevellia, Gervillia, &c. Gasteropods (Murchison, Pleurotomaria) are feebly represented, and the same is the case with the cephalopods (Nautilus, Orthoceras). It is worthy of note that the trilobites are represented by one form (Phillipsia)—the last appearance of that eminently Paleozoic order. Among the fishes the principal genera are Ophiomastus and Platyomastus. Amphibians are much rarer than in the preceding age; labyrinthodonts (Archegosaurus, Brachiosaurus, Pelsaurus). At this horizon true reptiles (Proterosaurus) make their earliest appearance.

In most parts of Europe where Permian strata are developed they rest unconformably on Carboniferous and other rocks, from which it is evident
that towards the close of Carboniferous times considerable earth-movements occurred in Europe, and resulted eventually in the isolation of certain areas, which thus became inland seas or salt lakes. In these latter molasse sandstones, dolomite limestones, rock-salt, and gypsum were accumulated, such as are the chief elements of the American "brine," or sultana, of the Riga, Berlin, and Hamburger, etc. Ourloner such inland seas covered large areas of what is now central England, and extended into southern Scotland and the north of Ireland. Similar large inland seas existed in middle and eastern Europe. The strata accumulated in such seas are often very beautiful, and the indications of shallow-water conditions, such as worm-tracks, sun-eracks, rain-pittings, and ripple-marks—evidences which indicates that the level of the lakes was often abnormally lowered during dry seasons, leaving wide tracts exposed over which crawled annelids, amphipods, and reptiles. Volcanic action was rife in Scotland and Germany, and it has been suggested that the abundant and well-preserved fish remains which occur in the Kupferschleifer may have been poisoned by the sudden influx of mineral springs connected with the volcanic districts, at intervals of time. Some of the inland seas may have had occasional connection with the open sea for longer or shorter periods, as, for example, during the formation of the thicker fossiliferous limestones. But, taken as a whole, the general character of the strata shows that they accumulated formed in inland seas. The climate of the period, so far as one can judge from the aspect of flora and fauna, was probably mild and genial. Nevertheless the occurrence of coarse breccias, with their scratched stones and erratics, in the strata of Permian and Triassic age, and the similar appearances met with in strata, which are believed to be of the same age, in India, Australia, and South Africa seem hard to explain without the agency of flowing ice.

Permissive Bill. See Local Option.

Permutations and Combinations. A combination, in Mathematics, is a selection of a number of objects from a given set of objects, without any regard to the order in which they are placed. The objects are called elements, and the possible selections are divided into classes, according to the number of elements in each. Let the given elements be the four letters $a, b, c, d$: the binary combinations, or selections of two, are $ab, ac, ad, bc, bd, cd$—six in all; the combinations of three are $abc$ only; the only one combination of four—viz. $abcd$. Permutation, again, has reference to the order of arrangement; thus, the two elements, $a$ and $b$, may stand $ab$ or $ba$, so that every combination of two gives two permutations; the three elements, $a, b$, and $c$, may stand $abc$, $acb$, $bac$, $bca$, $cab$, or $cba$, and combination of three thus affording six permutations. The combinations of any order with all their permutations are called the Variations. Formulas are given in works of algebra for calculating the number of permutations or combinations in any given case. Seven elements mark $1, 2, 3, 4, 5, 6, 7$, and two of these two are to be chosen; it is asked how many possible pairs of numbers there are, this is a question of the number of combinations of seven elements, two together, which is found as follows: $7 \times 6 \times 5 \times 4 \times 3 \times 2 \times 1 = 5040$. The theory of probabilities is founded on the laws of combination. Thus, in the case of drawing two tickets out of seven, since there are 21 possible pairs, the chance or probability of drawing any particular pair is $1 \div 21$, or $\frac{1}{21}$. In working out questions in 'combinations' advantage is often taken of the fact that, whatever number of elements be taken from a group to form a combination, the number left gives the same number of combinations; thus, the number of combinations of 10 elements three together, is the same as that of 10 elements seven together.

Pernambuco. See Recife, the busiest seaport of north Brazil, stands at the easternmost point of the coast, in $8^\circ 34'$ S. lat. It consists of three portions, connected by bridges—Recife (the 'roof') prosperous, compact, and beautiful, and extending along the winding streets, the chief seat of commerce, on a peninsula; San Antonio, a modern quarter, with straight, wide streets, on an island between the peninsula and the mainland; and Boa Vista, where are the merchants' villas, on the mainland. The principal buildings and public institutions embrace two arsenals, an observatory, the palace of the Bishop of Olinda (8 miles to the north), a law school, &c. The harbour is formed by a reef lying a quarter to half a mile from the coast, with an opening for vessels drawing 19 feet of water. Since 1880 some 2,000,000 tons of merchandise have been shipped, and the principal imports are sugar and cotton, with rum, hides, dyes, &c.; the principal exports are cottons and woollens, fish and meat, vegetables, minerals, wines, &c. The former fluctuates in value between $10,000,000 and $15,000,000, and the latter between $3,500,000 and $7,000,000. The nurseries, which supply the sugar and cotton crops; the imports average from one to two millions sterling. England, the United States, and France have the largest shares in this trade, England supplying about one-half of the imports, and between one-half and one-third of the exports.

Pernow (Ger. Perewin), a seaport of the Baltic Provinces of Russia, stands at the mouth of the river Pernow, at the northern extremity of the Gulf of Riga. 100 miles N. by E. of W. of Dorpat. Besides limed and barley, it ships large quantities of flax, principally to Great Britain. The total exports average £266,675 per annum (£323,000 for flax); the imports (herrings, coal, and chemical manure) only some £650,000. Pop. 12,918. The University of Dorpat was stationed here from 1699 to 1710.

Pérouse. See La Pérouse.

Perowen, John James Steuart, was born at Bideburn in Bengal, March 13, 1823, of a family of Huguenot origin. He had his education at Norwich grammar-school and at Corpus Christi College, Cambridge, carried off many prizes for theological knowledge and Hebrew, besides the Member's
Latin essay, graduated B.A. in 1845, and was elected Fellow of his college in 1849. He was afterwards examiner for the classical tripos, select preacher, Hulsean lecturer (1868), and Lady Margaret's preacher; professor in King's College, London; and from 1862 till 1872 vice-principal of St David's College, Lampeter. Later he was pre-lector in Theology and Fellow of Trinity College, Cambridge; preacher at the Chapel Royal, Whitehall; and canon residentiary of Llandaff from 1869 to 1878, when he was appointed Dean of Peterborough. Already, since 1875, he had been also Hulsean professor of Divinity at Cambridge, and an honorary chaplain to the Queen. In 1891 he succeeded Dr Philpott as Bishop of Worcester.

Dr Perowne is a sound Hebrew scholar, sat throughout in the Company for the revision of the Old Testament, and has been general editor of the admirable series of short commentaries forming "The Cambridge Bible for Schools." His principal work is his commentary on the Book of Psalms (2 vols. 1864-68), a masterpiece of exegetical science. Besides sermons and contributions to magazines, other works are his Hulsean Lectures on Immortality (1869), and Lampeter and Llandaff Sermons (1873).

**Perpendicular.** the name given to the style of Gothic architecture in England which succeeded the Decorated style. It prevailed from about the end of the 14th century to the middle of the 16th century, and was thus contemporaneous with the Flamboyant style in France. These styles have much in common, but they derive their names from the features peculiar to each. Thus, the Flamboyant (q.v.) is distinguished by the flowing lines of its triforium windows. The Perpendicular is remarkable for its stiff and rectilinear lines. The lines of the window-tracery are chiefly vertical, and the mullions are frequently crossed by transoms or horizontal bars. The mouldings are usually thin and hard. The same feeling pervades the other features of the style: the buttresses, piers, turrets, &c. are all drawn up and attenuated, and present in their shallow recesses and measure lines a great contrast to the deep shadows and bold mouldings of the earlier styles. The art of masonry was well under-stood during the Perpendicular period, and the vaulting was admirably built. Pan-tracery Vanishing (q.v.) belongs to this style. The depressed or four-centre arch is another of its peculiar features. In doorways the arched head is frequently enclosed in a square panel over the arch, with spandrels containing shields, quatrefoils, &c. Panelling was also much used, the walls being frequently covered entirely with it, as in Henry VII's Chapel at Westminster. There are many well-known buildings of this style. Most of the colleges at Oxford and Cambridge belong to it, and in almost every cathedral many chantry chapels have been erected. There are some specimens of it—e.g. William of Wykeham's nave at Winchester (q.v.). Open timber-rafts are very common in the Perpendicular style, and are amongst the peculiar and beautiful features of the architecture of England. The roof of Westminister Hall, built by Richard II., is the largest example ever erected.

**Perpetual Cure.** See Curate, Vicar.

**Perpetual Motion.** Formerly the attempts made to 'square the circle' led to an enormous waste of time and energy by repeated and unassailable methods, that the circular area cannot possibly be expressed in terms of the diameter or radius. It logically follows from the definition of a circle that it is a plane figure which does not admit of being squared. In the same way, to all who have understood the word force and motion, it follows from the definition of a machine that it does not admit of being perpetual, or selfmoved. Every machine is constructed to transmit motion or force. The machine, further, modifies the transmitted force, so as to overcome certain resistances, some useful and some prejudicial.' In every instance the motion of the machine is derived from without, and the energy so conveyed is to be at once referred to muscular action, or the weight of falling water, or a current of air, or the expansive force of steam, or some other natural power. Some such force is at once implied by the action of any machine, whether the motion is only commencing or has continued for an indefinite time. In an ordinary clock, for example, action is due to the muscular force expended in winding a spring or raising a weight; the sight of motion in wheels or levers compels us to believe that force has been exerted upon them, and that they are merely vehicles for transmitting it. The machine has gained so much motion and energy, but only at the expense of some exterior agent. The quantity of force in existence being fixed, no new stock can be created, and therefore a self-moving machine is absurd even in name. The practical engineer knows that the force of a steam-engine is exactly in proportion to the amount of coal burned per hour—the work depends on the consumption of heat. If the mechanical force produced is in excess, however small, of its equivalent (measured by the coal burned), then perpetual motion would be at last found, because then the engine would be generating force—i.e.
giving out more than was derived from the heat of the coals. This, of course, is impossible; it is from the inexhaustible stores of nature alone, such as fire, water, wind, chemical action, and electricity, that force is derived to give motion to any machine whatever. Instead of producing more force than it has received, and so laying up a stock of energy which might render it 'perpetual,' every machine must in its results show less energy than has been transmitted to it. Some of the machine's work is always spent on friction and the atmospheric resistance, so that it cannot give out all the force that was put in.

A 'simple pendulum swinging in an exhausted receiver, or a top spinning there, might illustrate the term Perpetual Motion, if friction could be avoided. Neither of these, however, could be called a perpetual machine. Give the top some work to do by putting it in gear, say, with a wheel or a crank, and speedily its motion slackens; which proves that, for a 'machine,' new force is constantly required from without, especially if anything more than mere motion is required. In the words of the French Academy (Histoire, 1775):

"Neglecting friction and resistance of air, a body whose motion has been given will retain it for ever, but only on condition that it does not act on other bodies; and the only perpetual motion possible, even on this hypothesis, would be useless for the purpose of the devisers. . . . Numerous mechanisms which might have been of great service have wasted (on this kind of research) their means, time, and talents."

The mere enumeration of all the chief attempts made in various countries to contrive a self-moving machine would be tedious. We shall only note some typical cases in each class. In one class of so called perpetual machines the essential part was a wheel revolving on a horizontal axis, with several movable weights so distributed round the rim as apparently to act more or less on one side than the other, and thus continue the revolution. One of these was by the ingenious Marquis of Worcester, and is described in his Century of Inventions as having been tried in the Tower before the king and court. On the same principle was Jackson's machine shown in fig. 1. In other attempts of this class, the sides of the wheels were divided symmetrically into cells with curved sides, each cell holding a ball which rolled about as the revolution took place, so that the balls should, by being further from the centre, act more on one side than on the other, as shown in fig. 2. A foreign instance, described in a letter to Newton as an unlooked for success, was that of Dr. Waverley, existing of a large wheel covered with canvas. When set in motion the speed increased till it reached a rate of twenty-five revolutions a minute; and when sealed up by the Elector of Cassel it was found at the end of two months to be moving as rapidly as ever. We must of course assume the existence of some imposition in this and more recent cases.

In another class of self-moving machines water or mercury became the prime motor, and was sometimes used in defiance of the most elementary laws of hydrostatics. One of these consisted essentially of a large vessel having a curved tube leading from the bottom up one side and bending over the brim. The inventor actually concluded that the great weight of the liquid in the vessel when full, or nearly so, must force the liquid in the tube up higher than the edge of the vessel, and thus cause a perpetual circulation.

Another class depended on magnetic action, such as Bishop Wilkins's inclined plane up which an iron ball was drawn in a groove by the attraction of a leadstone fixed at the top (fig. 3). Before reaching the leadstone the ball was ingeniously intended to fall through a hole in its path on to a curving incline beneath, and thus be conveyed by a second groove to the foot of the first inclined plane, in order to recommence its upward journey under exactly similar circumstances. The bishop overlooked the fact that the magnetic action would also tend to prevent a fall; but for that failure, he had come as near success as the laws of nature permit.

In Addeley's perpetual motion the wheel was surrounded by a set of magnets, projecting like teeth in a slanting direction, and having the S poles all towards the centre (fig. 4). Four larger fixed magnets were disposed outside the wheel, two of which at opposite points of the circumference presented their S poles to attract the revolving magnets, while half-way between them the other two presented their N poles to repel them. All the four magnets, however, acted against the inventor's purpose, as well as in the direction which he intended. In fact, if magnetic action or gravity could be temporarily nullified in a particular direction (as light is by interposing an opaque body) the problem of perpetual motion could immediately be solved.

Innumerable patents have been taken out for magnetic and electric machines, but in the principle of each some failure lurks, due to a misconception of the laws of force-transmission. A typical case is an electric machine driven by a gas-engine where the latter is heated by the decomposition of water by the electricity produced; just as if a steam-engine, for example, could be heated by the friction of certain bodies set in motion by itself.

Some intelligent and practical proposals have from time to time been made to utilise the rise and fall of tides as the motive power of machines. These, however, should not be classed as sometimes done, under those named 'perpetual,' since the supply of power is obviously derived from a natural source—the moon's attraction combined with the earth's daily rotation. A tide-mill, exactly as a water-mill or wind-mill, is entirely dependent on an outward supply of power, and can in no sense be termed self-moving or 'perpetual.' Ultimately, of course, all the forms of natural energy are to be referred to the sun, the
source of planetary force as well as life, whatever be their modifications. See H. Dircks, Perpetuum Mobile: Search for Self-motive Power (2d series, 1861-70).

Perpetuity, in English law, means an arrangement whereby property is tied up,—i.e., rendered inalienable—for all time or for a very long period. Testators and settlers have always been tempted to leave their effects forever entwined with the lands of the Catholic Church, with the Church of England, or with some other church or sect, with the King, or with the Crown, or with the public. In all such cases, if the property is to be divided among a family of Barnabas, or of Stearns, a trust will be created, to run, it will be observed, for a few years, and then will run forever. Such covenants, however, are not binding upon the courts, and are of no legal effect unless the conveyance itself is executed in the presence of some public officer, and is entered on the public records.

Perrin, a town in France, and a fortress of the first rank (dept. Pyrénées-Orientales), stands on the river Têt, 7 miles from the Mediterranean, 40 by rail S. of Narbonne, and 17 from the Spanish frontier. It commands the passes of the Eastern Pyrenees, and is defended on the south by a citadel, which overlooks the castle and the mountains of Roussillon, and by a detached fort. The streets are narrow and the houses of semi-Moorish construction, and show evidences of Spanish influence. The cathedral (begun in 1324), the Moorish-Gothic cloister-hall or bourse (1390), the town-house (1692), the building of the former university (1349-French Revolution), the palace of justice, and a college are the principal public buildings and institutions. Good red wine is made, sheep and silkworms are bred, vegetables and fruit grown, brandy distilled, cattle reared; and there is a good trade in wine, spirits, wool, cork-hoops, oil, cloth, and silk. As capital of the former county of Roussillon Perrin was in the hands of the kings of Aragon from 1172 to its capture by France in 1473; it was restored to Spain in 1493; but rebellions from 1563 to 1642, and other disturbances, have possessed it ever since. Pop. (1891) 31,432.

Perranzabuloe ('Perran in the sands'), a Cornish coast parish, 10 miles N. by W. of Truro. The rude little stone oratory (25 by 12 feet) of St Piran, who was sent to Cornwall by St Patrick in the 5th century, had been buried in the sands for a thousand years, and was discovered in 1642. This is probably the earliest ecclesiastical structure in England. Perran Round is a circular enclosure, with seven rows of seats that could seat 2000, in which miracle plays were performed of old. See works by Haslam (1844) and Trelawny (8th ed. 1884).

Perrault, Charles, immortal as the author of 'Puss-in-Boots,' 'Cinderella,' and 'Bluebeard,' was born at Paris, January 12, 1628, the youngest of an advocate's four sons. He was sent at nine to the College des Quatre-Nations for three years, and was then sent to the Jesuit college, and thence to the University of Orleans, where he studied law, and took his degree. He was admitted to the Bar at Orleans in 1651, but soon tired of the humdrum routine of the profession, and filled from 1654 till 1664 an ease post under his brother, the Receiver-general of Paris, and in 1669 was appointed to be a kind of secretary or assistant to Colbert in matters of architecture and art generally, and for twenty years enjoyed a salary, if not his master's friendship throughout, while by his influence he was admitted to the Academy in 1671. His poem, 'Le Siècle de Louis XIV.' (1695), became so popular that it was repeated, and Boileau's angry criticisms thereon, opened up the famous and foolish dispute about the relative merits of the ancients and moderns; to the modern cause Perrault contributed his ambitious but poorly argued Parallèles des Anciens et Modernes (4 vols. 1688-96). The same quarrel inspired his Éloges des Hommes Illustres du Siècle de Louis XIV. (2 vols. folio, 1705; new editions, 1800), a work which was thought to be a disgrace to the Academy.

Perth, a city in Scotland, on the River Tay, 11 miles N.W. of Dundee, and 90 miles S.S.W. of Edinburgh. It is the market for a large district, and has manufactures of cotton, woollen and linen goods, machinery, &c. Pop. (1871) 21,093; (1901) 31,555.

Perry, an agreeable beverage made from fermenting the juice of the peach, and it is probably the earliest ecclesiastical structure in England. Perran Round is a circular enclosure, with seven rows of seats that could seat 2000, in which miracle plays were performed of old. See works by Haslam (1844) and Trelawny (8th ed. 1884).

Perrault, Charles, immortal as the author of 'Puss-in-Boots,' 'Cinderella,' and 'Bluebeard,' was born at Paris, January 12, 1628, the youngest of an advocate's four sons. He was sent at nine to the College des Quatre-Nations for three years, and was then sent to the Jesuit college, and thence to the University of Orleans, where he studied law, and took his degree. He was admitted to the Bar at Orleans in 1651, but soon tired of the humdrum routine of the profession, and filled from 1654 till 1664 an ease post under his brother, the Receiver-general of Paris, and in 1669 was appointed to be a kind of secretary or assistant to Colbert in matters of architecture and art generally, and for twenty years enjoyed a salary, if not his master's friendship throughout, while by his influence he was admitted to the Academy in 1671. His poem, 'Le Siècle de Louis XIV.' (1695), became so popular that it was repeated, and Boileau's angry criticisms thereon, opened up the famous and foolish dispute about the relative merits of the ancients and moderns; to the modern cause Perrault contributed his ambitious but poorly argued Parallèles des Anciens et Modernes (4 vols. 1688-96). The same quarrel inspired his Éloges des Hommes Illustres du Siècle de Louis XIV. (2 vols. folio, 1705; new editions, 1800), a work which was thought to be a disgrace to the Academy.

Perthshire, a county of Scotland, lying on the southern slopes of the Grampian Mountains, and extending from the Tweed in the east to the Firth of Clyde in the west, and from the Clyde to the Dee. It is divided into two districts, Northern and Southern, and in the southern, there are the famous Huntingdon Forests, and also a great deal of forest land. The county is divided into three districts, Northern, Southern, and Western, and in the southern, there are the famous Huntingdon Forests, and also a great deal of forest land. The county is divided into three districts, Northern, Southern, and Western, and in the southern, there are the famous Huntingdon Forests, and also a great deal of forest land. The county is divided into three districts, Northern, Southern, and Western, and in the southern, there are the famous Huntingdon Forests, and also a great deal of forest land. The county is divided into three districts, Northern, Southern, and Western, and in the southern, there are the famous Huntingdon Forests, and also a great deal of forest land.
PERRY

diet-drink of those districts. It contains from 3 to 9 per cent. of alcohol. See CIDER.

Perry, Oliver Hazard, an American naval officer, born at South Kingston, Rhode Island, 23d August 1785, is famous for his defeat of a British force on Lake Erie in 1813. Perry, who had nine vessels, with 54 guns and 492 officers and men, fought six vessels, with 63 guns and 492 officers and men, and being four-fifths of the crew of his flagship, and finally won a complete victory, which he announced in the brief dispatch: 'We have met the enemy, and they are ours—two ships, two brigs, one sloop, and one schooner.' Perry died yellow fever, 23d August 1819, and was buried at Newport, Rhode Island, where there is a bronze statue (1885). See Life by A. S. Mackenzie (2 vols. New York, 1843), and In Feni- more Cooper's Lives of Distinguished American Naval Officers (1846).

Perrysville, a village of Kentucky, about 40 miles S.W. of Lexington, was the scene of a hard-fought battle between the Union and Confederate armies of Buell and Bragg, 8th October 1862.

Persecution. The principles that underlie the persecution of obnoxious opinions, as opposed to the principles of toleration, are regarded by those who persecute as essentially similar to those that arm justices against the criminal. Persecution on religious or political grounds has been especially common. The persecutions of the early Christians by the Roman emperors (see CHURCH HISTORY) have been usually, though artificially, counted as ten, viz. under Nero, 61 A.D.: Domitian, 95; Trajan, 107; Hadrian, 119; Marcus Aurelius, 165; Septi- minia Severus, 202; Maximinus, 233; Decius, 249; Valerianus, 257; Diocletian, 303. Some of the best of the emperors were thus the most strenuous persecutors of the Christians. The persecution seemed in many cases to fan the zeal of the victims and survivors; in Tertullian's words, the blood of the martyrs was the seed of the church. Cathari and Albigenses were practically persecuted out of existence by the Dominicians and the Inquisition; and the measures adopted to suppress the Reformations were triumphant in Bohemia and Spain. Roman Catholicism was thus complicated with politics (see BARTHOLOMEW, ST.; the Dragonades (q. v.) were part of a deliberate attempt to crush out Protestantism. The name persecution is used in England specially for the sufferings inflicted by Catholics on Protestants and by Protestants on Catholics in Mary's and Elizabeth's reigns; in Scotland also on the measures used against the Covenanters and other rebellants in the 17th century. The oppressive legislation against Independents in Charles II.'s reign may also be classed under this head; and Massachusetts and most of the Puritan colonies passed several repressive measures against the Quakers. The persecutions carried on in the Netherlands by the Spanish authorities (see HOLLAND) were especially persistent. They comprised fine, imprisonment, whipping, the gallow, strangling, stranguing and burning, burning alive, burning alive; and their continuance goaded the people into a great national revolt. It deserves to be noted that the strenuous denunciation by Vol- talgo of the most inhuman of the inhuman Caesars (q. v.) family led to a new chapter in the history of toleration. Furious persecutions extinguished Catholicism from Japan in the middle of the 17th century, and Corea in the middle of the 19th. The Orthodox Eastern Church has in Russia had the assistance of the state in repressing the Raskolnik sectaries. Luther and Melancthon were more persecuted by the princely Catholic authorities than the Catholic authorities. A notable case of the persecution of a Pro- testant by Protestants is that of Servetus (q. v.; see also CALVIN). In this case Calvin had the sympathetic support of many foreign Protestant churches and the leaders of the Reformed system established in Geneva by Calvin so confounded errors, sins, and crimes as to turn the administration of justice largely into a persecuting organisation; in three years there were fifty-eight sentences of death, and over eight thousand imprisonments for the crime of blasphemy (see Hug and Stonesfield, Switzerland, 1891). The old Scottish discipline of the kirk-session was regarded as persecuting in spirit long ere it ceased to be rigorously applied. The persecutions of the Jews were especially persistent and especially unsuccessful, and have recurred in recent years in Russia, Poland, and the Bosphorus. From other causes as persecution come much other bloodshed and strife, war and devastation, social oppression, and personal suffering. Metaphysical principles formed the watchwords of political as well as of ecclesiastical parties. 'These evils mostly came from that wicked and in- numerably dangerous fact in Christian history—the interference of the state, which gave the decrees of the councils that sanction which elevated the resolu- tions of the majority upon the deepest subjects of human speculation to the factitious rank of laws which must be accepted on pain of forfeiture, banish- ment, or death' (Hatch, Tihberr Lectures, 1888).

See also the articles named above, especially INQUIRI- ON AND TOLERATION; also ALBIGENSES, ALLA DA FÈ, BLAISEMERY, BRUNO, CAMISARDS, CATHOLIC EMANCIPATION, GALILEO, HERESY, HEGELGONIS, MORRIS, WAL- DENSIS, WITCHCRAFT; such works as Fox's Book of Martyrs on one side, and on the other Chalmers's Memoirs of Missionary Priests and other Catholics who suffered Death for Religion; Huckle's History of Civiliza- tion; Lecky's Rationalism in Europe; and Draper's Conflict between Science and Religion.

Pereds. See METEORS, Vol. VII. p. 158.

Persephone. See PROSERPINE.

Persep'olis ('Persian City'), the Greek translation of the lost name (Parsu-Kurta) of the capital of ancient Persia, was situated to the east of the river Medus (Polwar—i.e. Murghab), about 34 miles from the Caspian Sea. The ancient name of Persepolis is now given to Shiraz, in the plain of Mervshah, about 35 miles to the north-east of Shiraz, on the road to Ispahan. A series of most remarkable ruins is all that now remains of that city, with which, according to ancient writers, 'no other city could be compared either in beauty or in wealth, and which was generally designated 'The Glory of the East.' Darius Hystaspes, Xerxes, Artaxerxes, and other Achemenides each in his turn contributed towards its grandeur. Alexander the Great in his march of conquest said he had not seen Persopolis completely; but this must probably only be understood to apply to some of the chief palaces. It may also be presumed that after the fall of the Achemenides the extension of the original town (afterwards known as Isfakh), on which it was built, on the ruins of Persepolis and the temples used as royal treasuries up to the time of Epiphanes, gradually fell into decay. The situation of these structures, overlooking the vast luxurious plain of Mervshah, is described in terms of rapturous enthusiasm by every traveller from Charlemagne to Pococke. The most day distinguishable in the vast ruins existing on the spot. First, the Chehel-Minâr (Forty Pillars),
with the Mountain of the Tombs (Rachmed), also called Takht-i-Jamshid or the throne of Jamshid, after a fabulous king, the reputed founder of Persepolis. The next in order is Naqsh-i-Rustam, to the north-west, with its tombs; and the last, the building called the Haram of Jamshid. The most important is the first group, situated on a vast terrace of cyclopean masonry at the foot of a lofty block, and in many cases of this terrace is about 1500 feet north by south and about 800 east by west, and it was, according to Diodorus Siculus, once surrounded by a triple wall of 16, 32, and 60 cubits respectively in height. The whole intends to divide it into three terraces —the lowest towards the south; the central being 800 feet square and rising 45 feet above the plain, and the third, the northern, about 550 feet long and 35 feet high. No traces of structures are to be found on the lowest platform; on the northern, only the so-called 'Propylaia of Xerxes'; but the central platform seems to have been occupied by the foremost structures, which again, however, do not all appear to have stood on the same level.

There are distinguished here the so-called 'Great Hall of Xerxes' (called Chehel-Minar by way of eminence), the Palace of Xerxes, and the Palace of Darius. The stone used for the buildings is dark grey marble, cut into gigantic square blocks, and in many cases exquisitely polished. The ascent from the plain to the great northern platform is formed by two double flights, the steps of which are nearly 22 feet wide, 32 inches high, and 15 inches in the tread, so that many travellers have been able to ascend them on horseback. What are called the Propylaia of Xerxes on this platform are two massive stone-ways, which probably formed an entrance-gateway for foot-passengers, paved with gigantic slabs of polished marble. Portals still standing bear figures of animals 15 feet high, closely resembling the Assyrian bulls of Nineveh. The building itself, conjectured to have been a hall 82 feet square, is, according to the cuneiform inscriptions still extant, the work of Xerxes.

An expanse of 162 feet divides this platform from the central one, which still bears many of those columns of the Hall of Xerxes from which the ruins have taken their name. The staircase leading up to the Chehel-Minar or Forty Pillars is, if possible, still more magnificent than the first; and the walls are more superbly decorated with sculptures, representing colossal warriors with spears, gigantic bulls, combatants with wild beasts, processions, and the like; while broken capitals, shafts, pillars, and countless fragments of building- stones are to be found. The whole vast space of this platform, 350 feet from north to south and 380 from east to west. The Great Hall of Xerxes, perhaps the largest and most magnificent structure the world has ever seen, is composed to have been a rectangle of about 300 to 350 feet, and to have consequently covered 105,000 square feet or 24 acres. The pillars were arranged in four divisions, consisting of a centre group six deep every way, and an advance body of twelve in two ranks, the same number flanking the centre. Fifteen columns are all that now remain of the number. Their form is very beautiful. Their height is 60 feet, the circumference of the shaft 16, the length from the capital to the torus 44 feet. The shaft is finely fluted in fifty-two divisions; at its lower extremity begin a cincture and a torus, the first 2 inches in depth and the latter 1 foot, from whence devolves the pedestal, shaped like the cup and leaves of the pendent lotus, the capitals having been surmounted by the double semi-bull. Behind the Hall of Xerxes was the so-called Hall of Hundred Columns, to the south of which are indications of another structure, which Ferguson terms the Central Edifice. Next along the west stood the Palace of Darius, and to the south the Palace of Xerxes, measuring about 850 feet square, similarly decorated and of similar grand proportions.

For a more minute description see the travels of Niebuhr, Ker Porter, Rich, &c.; Ferguson's Palace of Nineveh and Persepolis Restored, Vaux's Nineveh and Persepolis, Rawlinson's Five Great Monuments, Madame Dacier's La Perse et La Susiane, M. Dieu-

![Great Staircase to Northern Platform, and Propylaia of Xerxes; Great Hall of Xerxes and Palace of Darius in the distance.](image-url)
Perseverance of Saints, a doctrine necessarily resulting from the most essential part of the Calvinistic system, and therefore held by almost all the confessors of that system. It is advocated not only by arguments from other doctrines, as those of election, atonement, the intercession and mediatorial dominion of Christ, imputed righteousness, and regeneration, but also from many texts of Scripture, as those which declare eternal life to be always connected with believing, and those which encourage the believer to depend on the faithfulness, love, and omnipotence of God. To an objection very commonly urged against it, that it tends to make men careless concerning virtue and holiness, its answer is that the objection is valid only against a doctrine very different from theirs, the true doctrine of Perseverance of Saints being one of perseverance in holiness, and giving no encouragement to a confidence of final salvation which is not connected with a present and even an increasing holiness.

Persia, a pleasant, old-fashioned market-town of Worcestershire, in a great fruit-growing district, on the Avon, 9 miles S.E. of Worcester. Holy Cross, the church of a mitred Benedictine abbey, originally founded in 689, is but a fragment—chancel, south transept, and central tower, mainly decorated in style, but with Norman and Early English features. It was restored by Scott, in 1863-65. Pershore has manufactures of stockings and agricultural implements. Pop. (1831) 2717; (1841) 2883; (1851) 2708. See Styles's History of Pershore Abbey Church (1839).

Persis, called by the natives Iran (see Aryan Race), the most extensive and powerful native kingdom of western Asia, is bounded on the N by the Transcaucasian provinces of Russia, the Caspian Sea, and the Transcaucasian provinces of Russia; on the E. by the Transcaucasian provinces of Russia, Afghanistan, and Persia; on the S. by the Persian Gulf and the Persian Gulf; and on the W. by Asiatic Turkey. It extends 900 miles from east to west and 700 miles from north to south, and has an area of about 638,000 sq. m. It consists for the most part of a great tableland or elevated plateau, which in the centre and on the east side is a dead level, about 10 feet above the sea, and on the north, west, and south is covered with mountain-chains. The provinces of Azerbaijan, Mazaranderan, Tiflis, Kurdistan, Laristan, and Fars are the most mountainous. From the southern boundary of Azerbaijan the majestic range of the Elburz runs eastward, following the line of the Caspian coast at a distance varying from 12 to 90 miles. On reaching Astrabad the mountains sink into ridges of lower elevation, one of which joins the Pamirians in Afghanistan. A little country lies north of this line; it terminates in the Damansur Koh chain, which sinks abruptly to the low plain of Turkistan. South and east of Azerbaijan a broad mountain-plain traverses Persia from north-west to south-east, the chains and valleys of which are covered by a belt of hills which consists lying in the same direction. To this region belong the mountains running from Hamadan to Shus, some of the peaks of which are clad with perpetual snow, and the Zagros Mountains and Dushlu Koh on the western frontier. The Persian mountains are mostly primitive; granite, porphyry, felspar, and mountain-limestone enter largely into their composition. They also exhibit indications of volcanic action. Damavand, a conical peak 18,600 feet in height, the highest summit connected with the Elburz range (or ranges), being an extinct volcano; and earthquakes occasionally occur. The Persian plateau, which lies in an angle formed between these mountains, is intersected by many subsidiary ranges and groups of mountains, and spreads east-west for 200 miles. The general elevation ranging from 2000 to 5000 feet is too low, level, the lowest part being the Great Salt Desert in the south-west of Khorasan, which has 2000 feet of elevation above the sea; while the average elevation of the whole plateau above the sea is about 3700 feet. See ASIA.

A great part of Khorasan, the north half of Kerman, the east of Irak-Ajeni, which form the great central plain, and detached portions of all the other provinces, with the exception of those on the Caspian Sea, forming more than three-fourths of the surface of Persia, and to say, are uncultivated wastes, to a small extent. A narrow strip of low and level country extends along the shores of the Persian Gulf and the Strait ofOrmuz. It consists of a succession of bare plains, occasionally interrupted by a plantation of palms near the seacoast rivulets which traverse it. It is called Dushtistan, or by the generic name, applied to many other localities, of Gurmail—i.e. the warm region, in opposition to the mountainous districts, called Sarkand, or the cold country.

Although so much of Persia is desert, some parts of the country are of exceeding fertility and beauty; the irrigated valleys, some of them 100 miles in length, between the various ranges of the Kerman Mountains abound with the rarest and most valuable vegetable productions. Great portions of the provinces of Fars, Khuizstan, Ardekan, and Azerbaijan have been lavishly endowed by nature with the most luxuriant vegetation; while the provinces of Ghilan and Mazanderan, which lie between the Elburz and the Caspian Sea, and the southern slopes of the Elburz are as beautiful as wood, water, and a moderately hot climate can make them—the mountains being clothed with trees and shrubs, and the plain, 300 miles long and 100 miles wide, studded with mulberry plantations, rice-fields, vineyards, orchards, orange grounds, and sugar and cotton plantations.

River and Lakes.—Persia has hardly one river that can be termed navigable, though some of them are several hundred miles in length, and of great width and volume of water. The Karun (q.v.) was opened to foreign steam-navigation from its mouth to Ahwaz (where there is a series of rapids) in 1890. The rivers which flow to the sea receive in the latter part of their course few tributaries, and from the only a narrow strip of land on each side of them, except when their waters are applied, by means of canals or other works, to the artificial irrigation of the soil. Most of the monuments of the architectural skill
and laborious industry of the ancient Persians in this department are now ruined. As a natural consequence of the nature and situation of its surface, Persia abounds with saline lakes, and there are nearly thirty of them having no visible outlets. The chief lake is Lake Urmiah (q.v.), in Azerbaijan. Lake Bakhtegan, in the east of Fars, the receptacle for the drainage of the northern half of that province, is about 60 English miles in length by 9 in breadth. Lake Shiraz is much smaller. Part of Lake Zirreh is included in the frontier of Persia.

Climate and Products.—The climate is necessarily very varied. What the younger Cyrus is reported to have said to Xenophon regarding the climate, 'that people perish with cold at one extremity of the country, while they are suffocated with heat at the other,' is literally true. Persia may be considered to possess three climates—that of the southern Dashtistan, of the elevated plateau, and of the Caspian provinces. In the Dashtistan the autumnal heats are excessive, those of summer more tolerable, while in winter and spring the climate is delightful. On the plateau the climate of Fars is temperate. About Isphahan the winters and summers are equally mild, and the regularity of the seasons appears remarkable to a stranger. To the north and northwest of this the winters are severe. The desert region of the centre and east, and the country on its border, endure most oppressive heat during summer and piercing cold in winter. The Caspian provinces, from their general depression below the sea-level, are exposed to a degree of heat in summer almost equal to that of the West Indies, and their winters are mild. Rains, however, are frequent and heavy, and many tracts of low country are marshy and extremely unhealthy. Except in the Caspian provinces, the atmosphere of Persia is remarkable above that of all other countries for its dryness and purity.

The cultivated portions of Persia, when supplied with moisture, are very fertile, producing an immense variety of crops. The chief cultivated products are wheat (the best in the world), barley, and other cereals, cotton, sugar and rice (in Mazanderan), and tabak or tobacco for the narghil or water pipe. The vine flourishes in several provinces, and the wines of Shiraz are celebrated in eastern poetry. Mulberries are also largely cultivated, and silk is one of the most important products of the kingdom. Owing, however, to the selfish and immense demands of the Persian government to procure healthy grain from abroad, the silk cultivation has of late years greatly diminished.

The forests of the Elburz abound with wild animals, as wolves, tigers, jackals, bears, buffaloes, foxes, and the Caspian cat. Leopards abound in Mazanderan, and lions in parts of Fars and Kurdistan. Among domestic animals the horse, the ass, and the camel hold the first place. The horses have always been celebrated as the finest in the East. They are larger and more handsome, but less fleet than the Arabian horses. The Caspian rivers abound with fish, especially sturgeon, great quantities of which are cured and exported to Russia. The mineral products of Persia are insignificant, with the sole exception of salt. Iron is abundant in Azerbaijan, but is not worked; copper occurs in considerable quantity in the mountains of Mazanderan and Kerman; and lead, antimony, sulphur, and naphtha also abound. Long before in length by 9 in breadth. Lake Shiraz is much smaller. Part of Lake Zirreh is included in the frontier of Persia.

Isphahan, looking south.
cathedral. Including those who have joined the Roman Catholic and Protestant churches, the whole number of Christians hardly exceed 50,000. The Jews number 15,000.

We have no certain information concerning the population of Persia. There can be no doubt that in antiquity, and even during the middle ages, while the irrigation works still fertilised great tracts of land, it protected a great population. In the 17th century the French traveller, Chardin, thought 40 millions not too high a figure. Recent travellers, however, reduced these sums to numbers varying from 15 to 8 millions. Much surprise was accordingly expressed when in 1868 Sir Ronald Tirwhitte remarked that the entire population did not exceed 6 millions, and was probably not over 4 millions. His estimate has since been generally accepted as the most trustworthy we have, although the official estimate in 1881 was 7,653,000. He divides the total roughly into a million inhabitants of cities, 1,750,000 nomads, and 1,700,000 peasants and villagers; and the following are his estimates of the population of the chief cities: Tabriz, 110,000; Teheran, 85,000; Meshed, 70,000; Isphahan, 60,000; Yezd, 40,000; Kerman, 30,000; Kerman-shahr, 30,000; and Teheran, 200,000. The latter has largely increased since this estimate was made, and in 1891 was said to have 210,000 inhabitants. There can be no doubt that the population of Persia has been long diminishing, a fact attributable to misrule and extortion, neglect of the great irrigation works, and the frequent occurrence of famines in a dry country where cultivation depends on an artificial supply of water.

The roads are utterly neglected. The houses, those of the wealthiest people not excepted, appear contemptible, being generally built of earth and mud, and even in the towns, with little attention to uniformity or order. They scarcely ever exceed one story in height, and they are surrounded by high blank walls. The public buildings, such as mosques, colleges, and caravanserais, are of similar appearance to the ordinary houses of common materials. The interiors, however, of the houses of the rich are sometimes perfect paradises of luxury and elegance. The miserable look of the towns is, moreover, greatly redeemed by the beauty of the gardens which surround them and their inlets.

Manufacture and Trade.—The trade of Persia is comparatively of little importance. The silk used to be the great staple, and is produced in almost every province, but chiefly in Gilan, Koushan, and Yezd. The repeated failure of the crop has, however, interfered very seriously with this branch of industry. Cotton and woollen fabrics, shawls, carpets, and felt are largely manufactured for use and export in different parts of the country. Trade is carried on by caravans with the interior of Asia and the chief towns of Persia. These caravans exchange the products of Persia for cloths, printed calicoes, shifting, copper sheets, hardware, glasses, and porcelain, tea, coffee, sugar, candles, paraffin oil, hiccider matches, and fancy goods. The principal trade centres are Tabriz, Teheran, Isphahan, and Bishapour. European goods are brought to Tabriz by Constantinople and Trebizond, and to Teheran partly by Tabriz, partly by the Caspian, and partly by Bishapour; while to Isphahan they are brought almost exclusively by Bishapour. In recent times the communication between Persia and foreign countries has been greatly increased by way of the Caspian owing to the development of the cuprous petroleum wells at Baku. By means of the cheap fuel thus obtained the Russian commercial fleet on the Caspian has increased fourfold, and railways have been made from Batum on the Black Sea to Baku on the Caspian, and from the eastern coast of the Caspian to Akhbad, Bokhara, and Samarkand. On the former sea there is a considerable traffic of schooners sailing weekly from Baku to Tabriz, and vessels sail weekly from Astrahkán and bi-weekly from Baku with merchandise for the Persian coast, touching at Enzeli, Mashhadisar, and Ashlurada. In the Persian Gulf the British India Steam-navigation Company has a regular line of five steamers running weekly from Bombay to Basra, and touching at Beuder-Abbas and Bushire. Port nighty steamers were started in 1889 by an English firm on the Kurn to paint between Mohamman role and Alwaz in virtue of the concession of free navigation granted by the Shah in 1888. In 1890 Mr. Cunard stated that in the north-west, north, and north-east districts a decided Russian superiority in trade was met and in parts disputed by British and Indian competition; in the south and west British ascendency is established and is being increased. The exports consist of wheat, rice, wine, raisins, almonds and nuts, olive-oil, tobacco, drugs, gums, resins, manna, opium, colouring matters, boxwood, walnut-wood, silk, wool, carpets, skins and furs, wax, pearls, turquoises, sulphur, napthia, salt; the chief imports are cotton goods from Britain, and broadcloths, jewellie, vogue, cutlery, wines, quinine, arms, metal wares, &c. The whole foreign trade of Persia has been estimated roughly at—imports, £3,300,000; exports, £3,000,000. The imports of British produce into the three ports of Bushire, Lingal, and Bender-Abbas amounted in 1885 to over £570,000, not including Indian cotton. Exports to Britain thence were worth £175,000. In 1889-95 the average value of imports from Russia was £87,000, and of exports to Russia £1,486,000. The export of Persian carpets—of which there are many varieties of texture—amounts to £150,000 a year. Many projects of railways have been forwarded since 1845, but up to 1850 only one of them had been carried out—viz. from Teheran to Shah Abul Amin, a place of pilgrimage distant only 6 miles. Tramways were laid down in Teheran, and an imperial bank established with branches in the other large towns, in 1889.

Government, Taxation, Education, &c.—The government of Persia is a pure despotism, limited only by the power and influence of the Mohammandan mollahs or priests, domestic intrigues, dread of foreign influence, and a love of private immunities and privileges. The principal source of revenue is customs derived from the foreign trade. The first minis is the principal chief against unjust government on the part of the monarch, while the latter three operate as powerful restraints on his ministers. The monarch, who has the title of 'Shah' and 'Pahlisbath,' possess absolute authority over the lives and property of his subjects. He disposes, the governors of provinces and districts, possess similar authority over those under them; their actions are, however, liable to revision by the Shah, who may summarily inflict any punishment upon them for real or alleged misgovernment, and an occasional investigation of the customary agricultural classes is almost a necessity of such a form of government. The central government consists of a ministry, nominally modelled on the cabinets of European states. Usually, however, the power falls actually, if not nominally, into the hands of a vizir. The Shah, nevertheless, is in reality his own prime minister, and even trivial matters are submitted for his personal decision. The principal ministers are those for the interior (practically the head of the government), for Foreign Affairs, for Finance, for War, for Telegraphs, &c. The President of the Council, who is at the same time postmaster-general and general secretary of state. The law both in civil and criminal cases is administered by the governors, who not infrequently refer
points of law, which is based upon the Koran and its commentaries, to mollusks and muskateedhs. The punishments commonly inflicted are fines, flogging (the bastinado), and death, either by decapitation, stabbing, or torture. The principal Hakim or government of provinces are chosen for the most part from among the members of the royal family. As a rule life and property are much more secure than is generally supposed. The revenue is derived from (1) a tax on the gross produce of land—25 per cent. may be taken in the case of impostums; (2) duties on cattle and flocks—in case of goats, sheep, and cows, 8 per cent. on value of wool and butter yielded; (3) customs dues; and (4) duties on provisions brought to market. It will thus be seen that the direct taxation falls almost exclusively on the land and its cultivators. In theory these are the taxes authorised by the government, but in practice a frightful system of bribery and extortion prevails. The wealthy and influential escape the rapacity of the provincial governors, but as much as possible is taken from the hard-working peasants. It is believed that the irregular exactions amount to a sum equal to the illegal assessments, and that not a penny of the money so extorted is applied to public purposes. The annual revenue in 1890-97 may be stated at from £1,000,000 to £1,775,000.

Elementary education is very generally diffused among the Persians. There are several state colleges where students are instructed in religion and Persian and Arabic literature. Among a considerable section of the upper classes it is asserted that the Mohammedan religion is losing its hold, and that infidelity is widely prevalent.

Politic Division, etc.—From the earliest times down to the present century Persia was divided into seven or eight great divisions; but about the time when it was attempted to introduce European civilization into the country, and discipline into the army, the country was divided into twenty-five provinces. There are many interesting ruins of ancient, populous, and celebrated cities in Persia—e.g. Persepolis (q.v.), and Isakhir, Rhages or Rê, Shahpur, Tis, Merv, Shusban, Hamadan, etc.

As a standing army, according to the recent army laws, consists of 200,000 men, but the majority of these exist only on paper. The regular army is really composed of about 30,000 infantry and 1000 artillery, while there are about 10,000 irregular cavalry, a few thousand irregular infantry, and the gunners. The officers in the Persian army are for the most part ignorant and inefficient, but the soldiers are obedient, sober, intelligent, and capable of enduring great fatigue. The irregular cavalry, which forms the bravest portion of the Persian army, is equal to the Cossacks in the Russian army, and much superior to the Turkish Bashi-Bazouks.

History.—According to the Shah Nameh of Firdausi, the history of Persia begins some thousands of years before the Christian era. Little less than 2000 years ago extracting the grains of historical truth that may be contained in the innumerable fables that constitute the native Persian annals, and as yet we must rest contented with the accounts derived from Greek writers. The north-western part of Iran, anciently called Media (q.v.), was, at the beginning of the Christian era, included in the Assyrian empire, but the Medes revolted, and in 704 B.C., under Dejobes, established an empire which sublimed both that of Assyria and their own kindred tribes of Persis. About 557 the Persians under Cyrus (q.v.—the Kai-Khusru of the Persians), renowned for his skill in forming kings, the Medes (who from this time became amalgamated with them), and established a mighty empire, which included, besides Persia, as far as the Oxus and Indus, Asia Minor, Syria, Palestine, and Mesopotamia. His son, Cambyses, a most ferocious and bloodthirsty tyrant (529-522), subdued Tyre, Cyprus, and Egypt. After the brief rule of the usurper Smerdis (522-521), Darius I. (q.v., surnamed Hystaspes—the Gryphus of the Greeks—521-485) mounted the throne. He was a politic and energetic prince, and succeeded in firmly establishing his dynasty, and adding Thrace and Macedonia to his empire; but his two attempts to subdue Greece were completely foiled, the first by the Thracians, the second by the Greeks at Marathon (490). His son, Xerxes I. (485-465), renewed the attempt to subdue the Greek states, and, though at first successful, was compelled by the defeats of Salamis and Plataea to limit himself to a defensive warfare, which exhausted the v.; sources of his kingdom. His son, Artaxerxes I. (465-425), surnamed Longimanus (the Bahan of the Persians, better known as Arshadir Deradjast), was a valiant prince, but he was unable to stay the decadence of Persia, which had now commenced. He, however, crushed a formidable rebellion in Egypt, though his wars with the Greeks and Ionians were unsuccessful. The empire now became a prey to intestine dissensions, which continued during the reigns of his successors, Xerxes II., Sogdianus, Darius II., Artaxerxes II., and Artaxerxes III. (q.v.). Darius III. Costerzhes (the Great) of this dynasty was compelled to yield his throne to Alexander the Great (known as Iskander or Senunder by the Persians), who reconquered all the former provinces of Persia, and founded a vast empire, which, at his death, in 324, was divided into four parts, Persia along with Syria falling to the share of the Seleucids, and its old dependency, Egypt, to the Ptolemies.

The Seleucids soon lost Bactria (now Balkh), which became independent under a series of Greek sovereigns, and about 246 Parthia Persia (now Northern Khorassan) also rebelled under Arsaces I., who founded the dynasty of the Arsacids, under whom the greater part of Persia was wrested from the Greeks, and maintained against both the Greeks and Romans. The Persian empire, including its provinces, which mainly included a great part of India, was overthrown by an influx of nomad tribes from Turkestan (160-140); and these invaders having been driven out by the Parthians, Bactria was added to their empire (188). But the dynasty of the Arsacids, which maintained itself for four hundred and fifty years, was brought to an end by a Persian named Ardashir Babegan, who managed to gain possession of Fars, Kerman, and nearly the whole of Irak, before Arham, the Parthian king, took the field against him. At last a great battle was fought (521 A.D.) on the plain of Hormuz, in which the Persians were completely victorious. Babegan was now hailed as Ardashir (Artaxerxes), king of Persia, and 'Shahân Shah,' or king of kings, his dynasty being named Sassanid from his grand-father Sassan. To Sassan the Sassanids owed their rise to a height of power and prosperity such as it never before attained, and more than once imperilled the existence of the eastern empire. The most notable kings of the dynasty were Shahpur I. or Sapor (240-273), who crushed the Babilon and captured the Serurian captive at Edessa; his grandson, Shahpur II., who also maintained an equal conflict with the Romans; and Chosroes 1. and 2. (q.v.), the latter of whom was ultimately crushed by Heraclius (q.v.) in 628.

The last Sassanid king, Yazdegerd (Yazdjlour), was driven from the throne, after a great battle at Nahavend (639) by the Arabs, who now began to extend their dominion in all directions; and from this period may be dated the gradual
change of character in the native Persian race, for they have been from this time constantly subject to the domination of alien races. During the reigns of Omar (the first of the Arab caliphs of 632-644 A.D.) and Ali, and the latter's successors (656-750) Persia was regarded as an outlying province of the caliphate, and was ruled by deputy governors; but after the accession of the Abbasid dynasty (750) Baghdad became the capital, and Khurasan the favourite province of the caliph's ministers. A large part of this province of Persia consequently came to be considered as the centre and nucleus of the caliphate. But the rule of the califs soon became merely nominal, and ambitious governors, or other aspiring individuals, established independent principalities in various parts of the country. Many of these dynasties were transitory, others lasted for centuries, and created extensive and powerful empires. The chief were the Tahtites (829-872), a Turkish dynasty in Khurasan; the Saffarides (Persian, 869-903), in Seistan, Fars, Iraq, and Mazanderan; the Samanids, in Transoxiana, Khurasan, and Seistan; the Dilmuqs (Persian, 933-1056), in western Persia; and the Ghaznevids (Persian, q.v.), in eastern Persia. These dynasties supplied each other, and were finally rooted out by the Seljuks (q.v.), whose dominion extended from the Caspian Sea to China and India; and from the Ghaznavid dynasty, which ruled in Khorassan (now Khiva), gradually acquired the greater part of Persia, driving out the Ghaznevids and their successors, the Ghurids; but they, along with the numerous petty dynasties which had established themselves in the southern provinces of Persia, were all swept away by the Mongols under Genghis Khan (q.v.) and his grandson, Hulagu Khan, the latter of whom founded a new dynasty, the Perso-Mongol (1253-1333). This race, becoming effeminate, was supplanted by the Eylikhans in 1333; but an eruption of the Turko-Turanian people from their home beyond the Caspian claimed the dominion, with the assistance of the Tamerlaine dynasty, which ruled in Khorassan (now Khiva), for the next 300 years (1382-1687). The Turko-Turanian people, which consisted of Afghans and Turks, were divided into tribes and subdivided among Timur's descendants, till, at the close of the 16th century, they were swept away by the Uzbegs (q.v.), who joined eastern Persia to their newly-founded khanate of Khiva.

In 1606, during the reign of Shah Abbas (1587-1629), in western Persia, the first prince of which (Isma'il, the descendant of a long line of devotees and saints), having become the leader of a number of Turkish tribes who were attached by strong ties of gratitude to his family, overthrew the power of the Turkomans, and seized Azerbaijan, which was the seat of their power. Isma'il rapidly subdued the western provinces, and in 1611 took Khorassan and Balkh from the Uzbegs; but in 1614 he had to encounter a much more formidable enemy—to wit, the mighty Selim, the Sultan of Turkey, whose zeal for the further extension of religion and animosity against the Shiites (q.v.). The Persians were totally defeated in a battle on the frontiers; but Selim reaped no benefit from his victory, and after his retreat Isma'il attacked and subdued Georgia. Till then the character of this monarch, whom the Shah declared to be not only the restorer of Persia, but the establisher of the faith in which they glory as the national religion—viz. the Shiah, as distinguished from the Sunni sect of Mahomedanism. His son Taimur (1553-1605), a pugnacious man, and his spiritually inclined rule, eventually drove out the predatory Uzbegs from Khorassan, without losing a war with the Turks, and assisted Humayun, the son of Baber, to regain the throne of Delhi.

After a considerable period of internal revolution, during which the Turks and Uzbegs attacked the empire without hindrance, Shah Abbas II. (1629-1666) recovered the throne, restored internal tranquillity, and repelled the invasions of the Uzbegs and Turks. In 1665 he inflicted on the Turks such a terrible defeat as kept them quiet during the rest of his reign, and enabled him to recover the whole of Khorassan, Khorasan, and Dagesthan, which had for a long time been separated from Persia; and in the east Kandahar was taken from the Great Mogul. Abbas' government was strict, but just and equitable; roads, bridges, caravanserais, and other conveniences for trade were constructed at immense expense, and the improvement and ornamentation of the towns were not neglected. His tolerance was remarkable, as he encouraged the Armenian Christians to settle in the country. Of his successors, Shah Safi, Shah Abbas II., and Shah Solim, the two former were sensible and judicious rulers, and advanced the prosperity of their subjects. During the reign of Sultan Hussein, a weak and bigoted fool, priests and slaves were elevated to the most important and responsible offices of the empire, and all who rejected the tenets of the Shiites were persecuted. The consequence was a profusion of grievances, and so strong an advantage to declare their independence and seize Kandahar (1709). Their able leader, Meer Vais, died in 1715; but his successors were worthy of him, and one of them, Mahmud, invaded Persia (1722), defeated Hussein's armies, and besieged the king in Isfahan till the inhabitants were reduced to the extremity of distress. Hussein then abdicated the throne in favour of his conqueror, who, on his accession, immediately devoted his energies to alleviate the distresses and gain the confidence of his new subjects. Becoming insane, he was deposed in 1725 by his brother Ashraf; but the atrocious tyranny of the latter was speedily put an end to by the celebrated Nadir Shah (q.v.), who first raised Taimur (1629), of the Safavеev race, to the throne, then deposed him and made his young son the nominal sovereign, and finally, on the latter's death, deposed him and established Nadir Shah (1736). But on his death (1747) anarchy again returned; the country was horribly devastated by the rival claimants for the throne; Afghanistan and Beluchistan finally separated from Persia, and the country was spitted up into a number of small independent states till 1755, when they were united by Kerim Khan, who re-established peace and unity in western Persia, and by his wisdom, justice, and warlike talents acquired the esteem of his subjects and the respect of neighbouring states. After the usual contests for the succession, accompanied with the usual barbarities and devastations, Kerim was succeeded in 1784 by Ali-Murad, Jaafar, and Lutf-Ali, during whose reign Mazanderan became independent under Aga-Mohammed, a Turkoman eunuch of the Kajar race, who repeatedly defeated the royal army and ended by deposing Lutf-Ali of his crown (1795).

The great eunuch-king, the first of the present dynasty, on his accession announced his intention of restoring the kingdom as it had been established by Kerim Khan, and accordingly reinvaded the places that had been thrown away. He besought the aid of Russia; but the Persian monarch, with terrible promptitude, poured his army like a torrent into the country, and devastated it with fire and sword. His conquest was, however, hurriedly completed when he was assassinated (1797). His nephew, Shah Mohamad Shah, after numerous conflicts, fully established his authority, and completely subdued the rebellious tribes in Khorassan. But the great commotions in
western Europe produced for him bitter fruits. He was dragged into war with Russia, and, by his accession, and by a treaty concluded in 1797, surrendered to that power Derbend and several districts on the Kur. In 1802 Georgia was declared to be a Russian province. War with Russia was recommenced by Persia at the instigation of France, and, after a series of contests between the Persians, the treaty of Gulistan (1813) gave to Russia all the Persian possessions to the north of Armenia, and the right of navigation in the Caspian Sea. In 1826 a third war, equally unfortunate for Persia, was commenced with the same powers, and ended by ceding to Russia the remaining possessions in Armenia, with Erivan, and a sum of 18,000,000 rubles for the expenses of the war. The severity exercised in procuring this sum by taxation so exasperated the people that they rose in insurrection (1829), and murdered the Russian ambassador, his wife, and almost all who were connected with the Russian legation. The most humiliating concessions to Russia, and the punishment by mutilation of 1500 of the rioters, alone averted war. The death of the crown-prince, Abbas Mirza, in 1833, seemed to give the final blow to the fortunes of Persia, who were the only man who seriously attempted to raise his country from the state of abasement into which it had fallen. By the assistance of Russia and Britain Mohammed Shah (1834-48), the son of Abbas Mirza, who succeeded, was enabled to demand reacknowledgment of sovereignty from his alleged vassals in parts of Afghanistan, Beluchistan, and Khiva, but an attempt he made to reannex Herat, "the key to India," was resisted by England. The war was terminated in 1838 by the landing of a small sepoys force on the shores of the Persian Gulf.

Nasr-ed-Din succeeded to the throne on his father's death in 1848. The new government announced energetic reforms, but at first failed as completely as those which had preceded it in carrying them out. Following his father's example, the new Shah resolved to reassert his claims in Afghanistan and Beluchistan. The ruler of Herat having recognised the claims of Persia, the English government remonstrated with the Shah, and he was compelled to sign an engagement (1853), by which he became bound to maintain his frontier, and to interfere with the internal affairs of Herat. In 1856, however, on the pretext that Dost Mohammed, the Ameer of Kabul, was about to invade Herat, the Persians again took the city. Thereupon a British army, power on the north-east, while overrunning that of the gulf, and, under Generals Outram and Havelock, repeatedly defeated the Persians, and compelled them to restore Herat (July 1857). Since that time the Persians have not interfered with the "key to India," but they have been engaged in a long series of disputes with regard to their frontier north and south of Herat. After the war of 1857 their encroachments became systematic. In 1868 they occupied Seistan, a province claimed by the Afghan, and extended their jurisdiction over part of Beluchistan; but at length they agreed with the Ameer of Afghanistan and the Khan of Khiva to restrict the extent of their claims by an agreement with the latter and the British, made in 1868 in the presence of Lord Canning, at the Hague; in 1878 the town and territory of Khoufour, on the Turco-Persian frontier, was ceded to Persia by Turkey. The north-eastern frontier was settled by a treaty between Russia and Persia in 1881. The great extension of Russian territory and Russian power on the north-east, while overshadowing Persia to some extent, have had the effect of sheltering the adjoining regions of Persia from the terrible inroads of the Tekke and other Turkomans, and thus enabling English officers, including Sir John Bateman-Champain, Sir R. Murdoch Smith, Sir Oliver St John, and Captain Pierson, did much to explore and indirectly to improve the local government of Persia in connection with the establishment, in 1864, of the Indo-European telegraph line. Now there are 4500 miles of telegraph line in Persia, partly worked by Englishmen, partly by the Persian government. In 1896 Nasr-ed-Din was assassinated, and his second son, Mazaffar-ed-Din, peacefully succeeded to the throne.

See ABBAXIJEES, DARIUS, GREECE, MARATHON, SALAMIS, &c.; and the following volumes of the Encyclopædia Britannica: (1863) Goldsmid's Eastern Persia (1876); Arnold's Through Persia (1876); Illia's In the Land of the Lion and the Sun (1883); and Persia as it is (1886); Benjamin's Persia and the Persians (1886); Hot. G. Curzon's Persia and the Persian Question (1891); and Merier's Hajjli Babah; Khanikoff's Ethnographie de la Perse (1895); Madame Dieulafoy's La Perse, la Chaldee, et la Susehante; De la Foreign Ministry's La Perse graphique, et Historique de la Perse (1891); Schwabe, Bibliographie de la Perse (1876); and German works by Petermann (1861), Polak (1865), Vandre (1867), Stolze (1891), and others. See also the histories by Sir John Malcolm (2 ed. 1828), R. G. Watson (1866), and Clemen's Markham (1874); Hawlinson's The Seventh Great Oriental Monarchy (1875); and Gude's History of Persia by Justi (1872), Niiilke (1877), and Gutsehman (1888).

PERSIAN ARCHITECTURE.—The architecture of Persia and that of Assyria closely resemble one another, and, owing to the mode and the materials in which they were constructed, their remains serve to illustrate and complete each other's history. In Assyria, where no solid building-materials existed, the walls are composed of masses of sun-dried brickwork, lined on the inside, to a certain height from the floor, with large sculptured slabs of alabaster. These have been preserved to us by the falling in of the heavy earthen roofs, with which, as the later Persian buildings explain to us, the Assyrian palaces were covered. The explorations of Layard and Botta have made these sculptures familiar to us. The Assyrian remains are all of palace-temples, buildings somewhat resembling the Egyptian temples were used as churches, and many of the sculptures represent the exploits of the king in war and peace. The palaces are always raised on lofty artificial mounds, and approached by magnificent flights of steps.

The buildings of Assyria are of two very early periods, the oldest at Nineveh being from 1300 to 500 B.C, and the more recent at Khorsabad and Kuyunjik from 800 to 600 B.C. To these succeeded Babylon in the reign of Nebuchadnezzar, and the Birs Nimrud; but these are mere masses of decomposed brickwork, without any sculptures of harder material (see ASSYRIA).

After Babylon ename Pasargadah, where the splendid palaces of Cyrus and Cambyses still exist, in ruins, and Persepolis, the capital of Darius and Xerxes (560-223 B.C.); and some remains are still to be found at Susa, Ecbatana, and Persepolis. At Persepolis we find the very parts preserved which at Ninimrood and Khorsabad are wanting; for here there is abundance of stone, and the pillars, walls, doorways, &c. (which in the early examples were on account of the risk of earthquakes) the sides of which are still preserved. This enabled Fergusson to restore these buildings; the subject has been further studied and illustrated with great care by M. Dieulafoy in L'Art Antiqu de la Perse (1884).

The halls at Persepolis were square in plan, having an equal number of pillars in each direction for the support of the roof, which was flat. In the
In 1886 some extremely interesting discoveries were made at Susa (Shushan) in south-western Persia by M. and Madame Dieulafoy, who unearthed and sent to the Louvre a splendid frieze in coloured enamelled bricks with life-sized figures of warriors from the palace of Darius I., and another similar frieze with lions from the palace of Artaxerxes. A fac-simile reproduction of the warrior frieze is in the Edinburgh Museum of Science and Art.

Modern Persian architecture is separated by a wide historic gap from that of ancient Persia, and, all posterior to the Moslem conquest, belongs to the type known as Saracenic or Arabian. But it seems that the old art of Persia has a more direct influence on that of modern Persia than has been sometimes admitted; and even the Egyptian type of Saracenic art (see ARABIAN ARCHITECTURE) may have been moulded by Persian as well as by Byzantine artists, working for the Moslem conquerors. In Persia itself there seems no doubt that architecture of Mohammedan Persia, which in its palmiest days rivalled in splendour that of Egypt, Bagdad rivalling with Cairo, is in many respects a reproduction of the ancient palaces of Nineveh and Babylon. In the mosques thick walls of imperfectly burnt bricks are covered with brilliantly coloured decorations of glazed and painted tiles and bricks. Fig. 4 is a view of the gateway of the Masjid Shah, or Great Mosque of Isphahan, dating from the reign of Shah Abbas the Great (1585-1628 A.D.).

PERSIAN LANGUAGE AND LITERATURE.—The ancient and modern idioms of Persia, which are in general designated as Iranian or West Aryan, belong to the great class of the Indo-European languages; but the term Persian itself applies more particularly to the language as it is now spoken, with a few exceptions, throughout Persia, and in a few other places formerly under Persian dominion, like Bokhara, &c. The more important and better known of the ancient idioms are (1) the Zend (the East Iranian or Bactrian language, in two dialects—the ‘Gatha idiom’ and the capitals, composed of bulls' heads and shoulders (fig. 2), between which the beams of the roof rested; while others were ornamented with scrolls like the Ionic order (fig. 3). The bases also are suggestive of the origin of that Greek style. This hall was 350 feet by 300, and covered more ground than any similar buildings of antiquity, or any medieval cathedral except that of Milan. The palaces of Persepolis stand on lofty platforms, built with walls of cyclopean masonry, and approached by magnificent flights of stairs, adorned, like the palaces, with sculptures somewhat similar to those of Assyria. The interiors were ornamented with paintings. The use of the arch was known in Assyria, as has been shown by the subterranean arched conduits discovered by Layard, and the gates of Khorsabad discovered by M. Place. The arches of the latter spring from the backs of sculptured bulls, and are beautifully ornamented with enamelled bricks.

Fig. 1.—Plan of Great Hall of Xerxes at Persepolis.

Fig. 2. Details of Persian Architecture.

Fig. 3.

centre a portion was left open for the admission of light, and sheltered by another roof raised upon pillars. The remains of the seventy-two columns with which it was adorned are still extant (fig. 1). The hall had thirty-six columns, six on each side, and on three sides there had an external portico, each with two rows of six columns. These columns had
ancient’ or ‘classical Zend’), which died out in the 3d century B.C.—one of the most highly developed idioms, rich in inflections, in the verbs as well as in the nouns, and in the former almost completely agreeing with Vedic Sanskrit; yet such as it is, it is the better absolutely abandoned, for it has survived it is no longer in the full vigour of life, but almost decaying, and grammatically somewhat neglected. Geographically, this idiom may be placed in northern Persia. Its alphabet is of Semitic origin, and the writing goes from right to left. There are three distinct idiom: first is Persian, the chief remnants of which are found in the cuneiform inscriptions of the time of the Achemenides, discovered in the ruins of Persepolis, on the rock of Behistun, and some other places of Persia (see CUNEIFORM). Some relics, chiefly consisting of proper names for gods and men, and terms for vessels and garments, have survived in the writings of the classical period, and in the Bible, chiefly in Daniel. This idiom is much nearer to Zend and Sanskrit than to modern Persian, the Persians (Persian, Mede, or Persian, in use during the period of the Sassanian [3d to 7th century A.D.], is an idiom largely mixed with Semitic words, and poorer in inflections and terminations than Zend. Its remnants consist of a certain number of books relating to the Zoroastrian belief and religious degree in which it was used. The language is not quite the same in all cases—according to the larger or smaller infusion of foreign words. The non-Iranian element is known as Huzvareh, and is simply Chaldee; while the Iranian element is but little different from modern Persian. They are distinguished in Pehlevi, and the writing varies accordingly, yet it is not certain whether the difference arises from their belonging to different districts or periods. When, however, Pehlevi ceased to be a living language, and the restoration of the pure Iranian had begun, people began to use the writing (chiefly of a sacred nature, as having descended to them from the Sassanian times) began to substitute in reading the Persian equivalents for the Huzvareh words. At last a new form of consonants to the sacred writing began to be distinguished into Zend characters by the Perseans, and the language was continued to be used, where each sign had but one phonetic value, and where all the foreign Huzvareh words were replaced by pure Persian ones; and this new form was called (4) Pehlevi. The transition from the Zend写作 to the modern language is called the Parase, or, as the Arabs and the modern Persians themselves call it, Farsi, in use from 700 to 1100 A.D., since the language purely of the south-western provinces, and distinguished chiefly by a peculiar style, rigid exclusion of Semitic words, and certain now obsolete forms and words retained in liturgical formulas. It is the Persian once written by the Parsees or fire-worshippers, and is in other respects very similar to the present or modern Persian (which also is invariably called Farsi by the modern Persians), the language of Jami, Nizami, and Hafiz. It is the most sonorous and muscular, while at the same time it is the most elegant and most flexible of idioms; and it is not to be wondered at that in Moslem and Hindu realms it should have become the language of the court and of the educated world generally in Persia, and thereby escape the decay which its analytical and grammatical structure, it exhibits traces only of that of the ancient dialects of Zend and Achemenian, of which it is a direct descendant. The elaborate system of forms and inflections characteristic of those dialects has been by general admission abandoned, but the peculiarities, which impart fullness and an incredible ease to speech and composition. The grammar of the Persian language has been called ‘regular,’ but the fact is that there is hardly any grammar worthy of mention. Thus, there is no gender distinguished in Zend, and the plural is as much a philological as a grammatical word, in such manner, the only distinction consisting in animate beings receiving the affix an, while the inanimate are terminated in ha. Imported Arabic nouns, however, invariably take their Arabic plural. Not even the pronouns have a gender of their own; the distinction between masculine and feminine must be expressed by a special word, denoting male or female. There is no article, either definite or indefinite. The flexion of the verb is equally simple. As to syntax, there is much, or, at all events, none which would not come almost instantly to anyone acquainted with the general laws of speech and composition. The time of its greatest brilliancy may be designated as that in which Firdusi wrote, when Arabic words had not swamped it to the vast extent that they have since done: the Persian remained still, as far as they had crept in, amenable to whatever rules the Persian grammar imposed upon the words of its own language. In the history of the Persian writing three epochs are to be distinguished. First, we have the Cuneiform epoch (B.C.), in the time of which there seems to have been in use a kind of Semitic alphabet for common purposes. This, in the second period, appears to have split into several alphabets, all related to each other, and pointing to a common Semitic origin (such as the different kinds of Pehlevi characters and the Zend alphabet) merely adapted to the use of a non-Semitic language. In the third period we find the Arabic alphabet enlarged for Persian use by an addition of diacritical points and signs for such sounds as are not to be found in Arabic (p, d, zh, g). The writing is but slightly different from the language which the ancient Persians used, however, to be in use a kind of Semitic alphabet for common purposes. Of the literature of the Persians before the Mohammedan conquest we shall not speak here, but refer to the article ZEND. The literary period now under consideration is distinguishable from its antecedents only by the fact that it was the period of the transition from Zend to the Persian language, and into the Persian language, imported together with the Koran and its teachings. The writers are one and all Mohammedans. With the fanaticism peculiar to conquering religions, all the representatives of old Persian literature and science, men and matter, were ruthlessly persecuted by Omar’s general, Saad Dam Abi Wakkas. The consequence was that for the first two or three centuries after the conquest all was silence. The scholars and priests who would not bow to Allah and his Prophet were put to death, others were destroyed or changed in the written word or in the oral tradition of that ancient culture, while those that remained at home were forced to abandon their wonted studies. Yet, by slow degrees, as is invariably the case under such circumstances, the conquered race transformed the culture of the conquerors to such a degree that native influence was paramount in Persia, even in the matter of theology. It is readily granted by later Mohammedan writers that it was out of the body of the Persians exclusively that sprang the foremost, if not all, the greatest scholars and authors of the Persians as well as of grammatical subjects, historians and poets, philosophers and men of science; and the only concession they made consisted in their use of the newly-imported Arabic
The Persian language. A further step was taken when the Persians, under upstart native dynasties, returned also to the ancient language of their fathers during the first centuries of Mohammedanism. The revival of Arabic bellicose and pagan sentiment was long lingering for a long time previously among the masses, then suddenly burst forth in prose and in verse, from the lips of a thousand singers and writers. The literary life of Persia, the commencement of which is thus to be placed in the 6th century A.D., existed in harmony with undisturbed gaiety for five centuries, and produced a host of writers in every branch of science and belles-lettres, of whom we can only here give the most rapid surveys, referring for the most important names to special articles.

At the 932 Abul Hassan Rudogi, the Blind, rose by the king's favour to such an eminence that he had two hundred slaves to wait upon him; but little has remained of his 1,300,000 distichs, and of his metrical translation of Bidpai's Fables. About 1000 we hear of Kubar, the Dilmunite prince, as the author of The Poem of Erode, and poems. In the time of the Ghaznevids, chiefly under Mahmud, who surrounded himself with no less than four hundred court-poets, we find those stars of Persian song, Anvari (1069), author of Wazik and Aura; Feruachi, who, besides his own poetic first work, wrote laws of the Persian metrical art; Eseli, from Tus; and, above all, Firaulani (q.v.), the author of the Shah-Namaeh. Under the Atabek dynasty was the panegyrist Ashad-ed-Din Anvari, who, with his praise, well knew how to handle satire. Nizami (about 1260) is founder of the romantic epic; while Persia is the mystic (Sufistic) poetry, which, under Anamcric and allegorical, in glowing songs of wine and love, represented the mystery of divine love and of the union of the soul with God (see Sufiism). In this province we find the famous Omar Khayyam (q.v.; died 1123), and Farid-ed-Din Attar (born 1216), the renowned author of Pend-Namaeh ('Book of Counsel'), a work containing the biographies of saints up to his own time; such is the depth and hidden meaning of his mystic poems that the whole modern world has basied itself with commentators on the meaning of his sacred poetry. He died about 1330, more than a hundred years old, as a martyr. Greater still in this field is Jalal-ed-Din Rumi (died 1273), whose poem on Contemplative Life has made him a master of mysticism, which is up to this day; he wrote also a great number of lyrical poems. The 13th century cannot better be closed than with Sai'di (q.v.), the first and unrivalled Persian didactic poet. But far above all shone Hafiz (q.v.), who sang of wine and love, and nightingales and mountain flowers. After him the full glory of Persian poetry begins to wane. Among those that came after him Jami (1419-92) stands highest, a poet of most varied genius, second only in every one of the manifold branches to his chivalric and didactic and Sa'di, in romance to Nizami, in mysticism to Jalal-ed-Din, but most brilliant as a romantic poet. Of prose works we have by him a history of the Sufis, and an exceedingly valuable collection of epitaphs and models. The dramatic poetry of the Persians is not without modern extension. The numerous tales, stories, novels, anecdotes, anthologies, and all the miscellaneous entertaining literature in which Persia abounds form a fit transition from prose to poetry. Able rivals of the great Arabic histories have sprung up at an early period. For the mythical time of the Persian gian's gigantic eyes remains the only source. Reshid-ed-Din, the vizier of Ghazan (born 1247; executed in 1320), wrote a summary of the history of all Mohammedian countries and times, containing besides a complete history of sects. His contemporary Wassis is the model of the grand rhetorical style. His most successful imitator in the 15th century was Shams ibn-Din, who wrote the history of Tamerlane. Up to the end of the period there has been considered the principal beauty, if not the chief merit, of a classical Persian history. From the 16th century downwards a healthy reaction set in, and simplicity and a striving for the real representation of facts became the predominant fashion. Foremost amongst these modern historians is Khusraw, whose Universal History comprises the period from creation to the reign of Sultan Hasan Behkarn. His son Khondemir also wrote history. Among Indian historians who wrote in Persian we have Mohammed Khusro Pershtal (1640), who wrote the ancient history of India up to the European conquest, and Mohammed Haslim, Abul Fadel Moharek, and others. The Meahar Sultanwye, which contains the history of the present dynasty of Persia, and was published at Tehran in 1825, was translated by Briquet.

Biographies, legends, histories of martyrs, and the like are legion. Most of the biographies of the Prophet, however, are taken from the Arabic. Works on geography—generally treated together with history—are those of Mestafi, Alhin Ahmed, Nizami, Rudegi, Bonit, and in the translations of the Koran, commentators and Frenchmen's, and the portions of the Traditions has been produced. Jurisprudence has likewise to show little that is original, and not mere translation, partial commentary, or adaptation in Persian. The Hedadshi, the Jami, the Peniian Alemgiri are the most important legal works. Much has been written on medicine, surgery, pharmacy, and physical sciences by Persians, but nearly all their chief works are in Arabic. Mathematics, astronomy, and philosophy have not been neglected; rhetoric, works on letter-writing, and on numerical and poetical arts are numerous. Grammar and lexicography found their principal cultivators in India. Translations from Greek, Indian, Arabic, Turkish, and other languages into Persian exist in abundance.

There is no good history of Persian literature; but there is a mass of information in the following, of Stewart (1809), Ouseley (1831), Morley (1854), Spengler (Calcutta, 1854), Eien (Long. 1879), and others. See the articles in this work on FIRDOUSI, HAFEZ, OMAR HAYYAM, BAYTAI, KHOA'N, and others. Among women's, are those of Johnson and Richardson, Vullers (1867), Palmer (1876-84), Steinag (1884-92), Wollaston (1888).

Persian Gulf, an arm of the Indian Ocean which penetrates between Arabia and Persia to the extent of 650 English miles in a general north-westward direction. Its breadth varies from 35 miles at the mouth to 250 miles, and the area is estimated at 77,450 sq. m., not including the islands, which are scattered over the western half, or lie close inshore along the eastern side. The chief of these islands are Ormus, at the mouth; Khush, 810 sq. m, in extent, and the Bahrein Islands. The Great Pearl Bank stretches along the western side from Ras Hassan to nearly half-way up the gulf. The coast is mostly formed of calcareous rocks. On the Arabian side it is low and sandy, occasionally broken by mountains and cliffs; while on the Persian side it is higher and abrupt, with deep water close inshore, owing to the mountainous country of Fars and Luristan running close to the water's edge. The islands are partly of limestone and partly of ironstone, and are generally destitute of springs, barren, desolate, and presenting numerous masses of cactus, salt, and mud eruptions. Excepting, the Shat-el-Arab (see EUPHROTES), the Persian Gulf receives only insignificant streams. Its eastern side presents
abundance of good anchorage, either in the numerous bays or in the lee of islands. The greater portion of its southern shores now belongs to the Iman of Muscat, while the whole of the northern shore belongs to Persia. The order of the periodic currents in this gulf is precisely the reverse of that of the Red Sea. They commence from May to October, and descend from October to May. The greatest depth does not exceed 50 fathoms; and Dr John Murray calculates its total cubic contents at 2200 cubic miles of water. Oriental geographers give to this gulf the name of the Great Sea, a title used to denote the Mediterranean, -a green colour, lying along the Arabian coast.

The submarine telegraph cables belonging to the government of India, and forming part of the system of the Indo-European Telegraph, pass through the whole length of the Persian Gulf, from Fao at the mouth of the Shat-el-Arab, where they connect with the Turkish lines, to Bashire, where they connect with the Persian, and thence to Jask, Gwadar, and Kurraheee, where they connect with the general telegraph system of India. Among the ports are Bender Abbas (q.v.), Bashire (q.v.), and Bushire (q.v.).

Persian Powder. See Insect-Powder.

Persigny, Jean Gilbert Victor Flaran Du C du, an adherent of Napoleon III., was born at Saint-Germain-l'Esparre (dept. Loire), 11th January 1808, entered the cavalry school at Saumur in 1826, and the 4th Hussars in 1828; but he was expelled from the army for insubordination in 1831. Then, having been introduced to Louis Napoleon, he secured his favour, and commenced a career of Bonapartist propagandism throughout France and Germany. He had the chief hand in the affair of Strasburg (1836) and in the descent on Boulogne (1840), but was captured there, and condemned to twenty years' imprisonment. On the breaking out of the revolution in 1848 Persigny was one of the men who secured the election of Napoleon as President of the Republic; he also took a prominent part in the coup d'etat of December 1851. In January 1852 he succeeded De Morry as minister of the Interior; from 1855 to 1860 (except for one year) he was ambassador at the English court; then he resumed the office of minister of the Interior until June 1863. In September of the same year he was created duke. Thereafter he sat in the fall of the empire, when he escaped to England. He died at Nice on 21st January 1872.

Persimmon. See Date Plum.

Persius (Aulus Persius Flaccus), third in the line of Roman satirists, being later than Lucilius and Horace and earlier than Juvenal, was in some respects the ablest, certainly the most dramatic, of the four. Born of a distinguished equestrian family, 4th December 34 A.D., at Volaterrae in Etruria, he lost his father when six years old, was educated till twelve in his native town, and thereafter in Rome under the grammarians Remusius Palanen and the rhetorician Virginius Flavius. In 10 B.C. he lost his mother and affection to Seneca, to which, on the recommendation of the Stoic philosopher Cornutus, who imbued him with the tenets of his school and gave his mind and character an impress which ever deepened and strengthened. But he died before connecting his twenty-eighth year.

The selection entertained by the master for his pupil was shared by the friends of the latter—Lucan, Celsus Bassus, the lyric poet, and other contemporaries of light and learning, among whom, however, Seneca had little estimation. The noble and virtuous Peter Trissene accompanied him on several tours through Italy, finding a kindred soul in the modest, prepossessing youth, whose integrity and piety were conspicuous in his worldly as in his family relations. The austere discipline of Cornutus affected the style of Persius, who, in consequence wrote fastidiously and sparingly, leaving at his death six brief satires, the whole not exceeding 650 lines. These were slightly corrected by Cornutus and edited by Casaubon. Persius, however, even through the early mediaval darkness till the Renaissance and down to our own day, the highest esteem, fathers of the church like Augustine and Jerome, humanists like Buchanan and Casanov, antinomists like the Pietists, have been evolving and interpreting the poet's pregnant, if sometimes obscure, ridicule of the rapidly degenerating life of 1st century paganism. The best satire is, on the whole, the first, on the prevailing false taste in poetry. 'Probably no writer ever borrowed so much and yet left on the mind so decided an impression of originality,' says Conington, who further indicates the striking resemblance between the genius of Persius and that of Carlyle. He has had many editors, of whom the most helpful have been Casaubon (1693), Otto Jahn (1843-68), and Conington, whose revised edition (Oxford, 1873), gives text, prose translation, and notes embodying the best results of previous criticism. He has had a host of translators in the chief modern languages—that of the Italian Sacchi of Faenza surpassing all others, not excepting the English versions by Drayton and Gifford.

Person (Lat. persona, 'a mask') came to be applied to the person wearing the mask, and thus to mean a personage, an individual, a numerically distinct being. In theology there is a special use of the word for the three Persons of the Trinity (q.v.). The name Person, when applied to the Trinity by the Latins; the corresponding Greek word, Prosopon, being of later use. The earlier Greek Fathers used the word Hypostasis, 'substance,' where the Latins used Persona, and considerable controversy for a time grew out of this diverse use; after the condemnation of the Sabellian heresy, and still more after the Council of Nicea, all ambiguity of words being at an end, the controversy turned upon the substance of the doctrine, in the form of the Arian controversy. See ARIUS.

Personal Equation. See Equations.

Personal Exception, in the law of Scotland, the equivalent of the English Estoppel (q.v.); a ground of objection which applies under the name of Double Personality or Double Consciousness; the records of medical science contain many
cases of mental disorder, in which the sense of personal identity is curiously interfered with. Cases are, of course, of constant occurrence in which the patient mentally affected conceives himself to be some one else (e.g. Napoleon or a Scripture character). Others conceive that parts or properties of their frame belong to another person, that they are inhabited and ruled by a spirit or entity acting in opposition to their will and interests. Others, again, are possessed by the idea that they are two persons at once, or rather that their body is the seat of two beings who are often in strife together, one being generally identified more strictly with the self, and the other being regarded as a hostile power and a manvatis suget who prompts the better self to evil courses. The struggle between the two persons of this duality often takes bodily shape, and the patient maltreats his own body under the impression that he is castigating the vicious 'other one' who haunts him. This alienation or extrusion of part of the individual's experience from the inner circle of the personality may be due, it has been suggested, to a more or less profound automatism in the consciousness of the state of the body as a whole. Any part of the body in which this common sensibility is wanting or disturbed is regarded by the patient as no longer a part of himself, and even as belonging to some hostile being. Even hallucinations of such somatic insensibility that the individual doubts or denies his own existence, as in the case of a patient cited by Ribot, who declared that he had been dead two years, though (according to his own account) he still continued to exist in a somnambulistic fashion in which he was not consciously interested. These manifestations, however, are not what is meant by double consciousness in the strict sense of the term. Double consciousness does not necessarily imply the presence of any insane delusion as to the patient's present existence and surroundings, but consists in the fact that a certain portion of his past life is temporarily withdrawn altogether from his conscious memory, to reappear, however, at a later period, when he will have as completely forgotten this previous experience and the whole section of his life connected with them. In the normal human being the memory is unitary, and consequently the life-experiences of the individual are felt and recalled as parts of one whole. In those morbid cases, on the contrary, the conscious life appears, as it were, to be cut into sections of lengths which are entirely disjuxtaposed, and retained, so to speak, in separate memories. These mutually exclusive sections are remembered by the individual intermittently in successive periods, generally separated from one another by a somnambulistic, drunkenness, as to the patient's present existence and surroundings, and gradually become acquainted with the persons and objects around him, like a being for the first time brought into the world. In these exercises she made considerable proficiency. But after a few months another fit of somnambulism invaded her. On rousing from it she found herself the same as in the former state she was in another person, but the paroxysm, but was wholly ignorant of every event and circumstances that had befallen her afterward. She is as unconscious of her double character as two persons are of their respective natures. For example, in her old state she possesses all the original knowledge, in her new state only what she acquired since. In the old state she possesses fine powers of pensmanship, while in the new she writes a poor, awkward hand, having not had time or means to become an expert. A similar experience is observable in the case of somnambulists, who are totally ignorant, in the waking state, of their somnambulistic experience, but when again in the somnambulistic state recall what happened in the previous crisis. Lost objects have been recovered, and even crimes brought to light by taking advantage of this peculiarity. The same phenomenon is observable even in the cases of intoxication, when a woman, in one fit of drunkenness being remembered in the next, but forgotten in the sober interval. Instances of double consciousness, however, are not always of the precise type mentioned by Macnich. Thus, in one of the cases of somnambulism cited by Félicité X, reported by Dr Azani, the woman was conscious during the second state of her whole life-experience, but during the first or original state knew nothing of anything that had happened in the second. The alternations began in this case in 1856, and continued for more than thirty years, and it is remarkable that the second state, which at first appeared only in short dream-like periods, has gradually supplanted the first state, which now recurs only at long intervals, and for a few hours. The second state is physically and mentally superior to the first, and the patient herself speaks of the first as état bête. A still more extraordinary case, reported from Paris, is that of Louis V., a young man of epileptic and hysterical temperament and criminal tendencies (born 1863), where, as a result of his treatment, six states which are mutually exclusive, but which, taken together, embrace his whole past life. These and other cases are commented upon by Ribot in his Diseases of Memory and his Mélanges de la Personnalité, and by Mr F. W. Myers in an article on 'Multiple of Personality' (Mind, November 1886). The phenomena of double consciousness have also been aptly described as periodic amnesia. They evidently depend upon morbid action of the brain—it has been suggested, upon an abnormal severance and consequent independent action of the two hemispheres—but the physico- logical conditions are still full of obscurity. An ingenious literary use of the notion of double personality, on completely different planes of morality, is seen in Mr R. L. Stevenson's creation of Dr Jekyll and Mr Hyde.

**Perspective** (Lat. perspectio, 'I look through') is the art of representing several objects on a plane surface in such a manner that the representation shall affect the eye in the same way as the
objects themselves. The distance and position of objects affect both their distinctness and apparent form, giving rise to a subdivision of perspective into *linear perspective*, which, as its name denotes, considers exclusively the effect produced by the position and distance of the observer upon the apparent form and grouping of objects; while *aerial perspective* confines itself to their distinctness, as modified by distance and light. The necessity of attending to the principles of perspective in all pictorial drawing is apparent when we consider, for instance, that a circle when seen obliquely appears to be a long one, with its shortest diameter in line with the spectator, and its longest at right angles to this. A square, when looked at from a position opposite the middle of one of its sides, appears as a trapezoid, the sides which are perpendicular to the direction of vision appearing to be parallel, while the other two appear to converge to a point in front of the spectator, &c.

For the same reason two rows of parallel pillars of equal height, seen from a point between and equidistant from each row, appear not only to converge at the further end, but to become gradually smaller and smaller. An excellent idea of a perspective plan can be easily obtained by interposing a vertical transparent plane (as of glass—a window, for instance) between the observers of his vision, and supposing that the objects he sees are not seen through the glass, but painted on it. A sketch made on a glass plane, in this position, by following with a pencil all the lines and shades of the objects seen through it, the eye being all the time kept quite steady, would form a picture in perfect perspective. In practice, however, it is found unfortunately that glass is not a suitable material for sketching on, and that the vertical position is not the most convenient; it is therefore preferable to make a careful study of the effects produced by change of position and distance on the appearance of objects in nature, and from the results thus obtained, by the observance of which painters may be enabled to produce an effect true to nature. After the 'scope' (i.e. the number of objects to be introduced, and the distance at which they are to be viewed) of the picture has been determined, and before the sketch is commenced, it is necessary to draw upon the perspective plan three lines: (1) The base line, or ground line, limits the sketch towards the operator, and is the base line of the picture. (2) The horizontal line represents the ordinary position of the sensible horizon. The height of the horizontal line is about one-third of the height of the picture, when the sketcher is placed at or little above the level of the horizon; but it may rise in a degree corresponding to his increase of elevation till it reaches near to the top of the perspective plan. The general rule is to have a high horizontal line when the view is taken, or supposed to be taken, from an eminence; but when the station is on a level, either actual or assumed, as is the case when a statue or a magnificent landscape is figured, the horizontal line may be low. The line when the view is taken, or supposed to be taken, from an eminence; but when the station is on a level, either actual or assumed, as is the case when a statue or a magnificent landscape is figured, the horizontal line may be low. (3) The vertical line is drawn from the supposed position of the spectator, perpendicular to the ground and horizontal lines, meeting the latter in a point which is called the point of sight, or center of projection.

All vertical lines in nature being parallel to it in the picture. The point of sight, being the point directly opposite to the observer, is properly placed in the centre of the picture, for it is most natural that the view should lie symmetrically on each side of the principal visual line; but this is not by any means a universal rule, for we very frequently find it on the right or left side, but always, of course, on the horizontal line. All lines which in nature are perpendicular to the ground line, or to a vertical plane which is raised upon it as a base, meet in the point of sight, which is thus their vanishing point (see the line of the tops and bottoms of the pillars in fig. 1). The points in the horizontal line on each side of the point of sight, and in a 'direct' sketch are at a distance from it equal to the horizontal distance of the spectator's eye from the ground line. The equality of distance of these points from the point of sight is not, however, necessary, as it occurs only in those cases where the lines, of which the points of distance are the vanishing points, are inclined (in nature) at an angle of 45° to the base line; but in all cases the two points of distance are about twice as far apart as the eye is from the picture. One important use of the points of distance is to define the distance of objects in a row (fig. 1) from each other. For this purpose two points of distance are not necessary, as when the position of one pillar is found, that of the one opposite is at once obtained by drawing a line parallel to the base or ground line. We have seen that the point of sight is the vanishing point of all lines, and that the ground line is a vertical plane on it at right angles, and that the points of distance (in a direct picture) are the vanishing points of all lines which cut the ground line at an angle of 45°; but there are many other groups of parallel lines in a picture which have different situations, and therefore different vanishing points. Such lines with their vanishing points (called for distinction's sake accidental points) are represented in fig. 2. If the accidental point is above the horizontal line, it is called the accidental point aerial; if below, the accidental point terrestrial; and a little consideration makes it evident that these points may or may not be situated within the plane of the picture. Such are the points and lines necessary for the construction of a plan in true perspective; and from the above explanation we may deduce the two general principles: (1) that all parallel straight lines in nature are no longer parallel when projected on the perspective plane, but meet in a point which is called the vanishing point, and is some one of the three above described, unless these lines happen to be also parallel to the ground line or the vertical line, in which case they remain parallel when transferred to the picture; and (2) that, since the bodies drawn below the horizontal line are seen as if from above, those above as if from below, and those to the right as if from the left, the left of the spectator's eye, if observed from the left and right, it follows that straight lines which in the picture are above the horizontal line lower themselves, those below raise
Aerial perspective consists in a modulation of the brightness and colours of objects in accordance with the state of the atmosphere, the depth of the body in the perspective plane (i.e. distance in nature from the ground line), and other accidents of place and time. As the distance of objects increases, their illuminated parts are made less brilliant and their shaded parts more feeble. The bluish tint imparted by a large mass of the atmosphere to the bodies seen through it is frequently imitated by the mixing of a slight tint of blue with the colours to be applied; a yellow object thus assumes a greenish tint, a red one a violet tint, &c. The air when charged with vapour is represented by a diminution of the brightness of colours, and by the grayish tint imparted to them. But in this part of the subject rules are of little avail, for experience alone can guide the painter in faithfully copying the myriad aspects presented by nature.

A thorough knowledge of perspective is a sine qua non to the painter or designer, and though many are inclined to think it a superfluity, and that the sketcher has only to make use of his eyes and copy justly, the very fact that such is their opinion shows that they have never made the attempt: for it is impossible for the painter, and much more so for the designer, to execute a copy of nature with sufficient accuracy by the sole aid of the eye and hand, a fact that is unfortunately too frequently proved by many of the sketches exhibited in fine-art collections. Perspective was known to the ancients, but seems to have become extinct during the disturbances that convulsed Italy, and was revived by Albert Dürer and Bramantino of Milan (c. 1470-1535), whose body of rules was extended and completed by Perruzzi and Ubaldi about 1600. Dr Brock Taylor in 1715 and 1719 was the first Englishman who discussed the subject scientifically.

There are works on perspective by Trywhitt (1668), Humphris (1699), Collins (1672), Dennis (1677), Pellegrini (New York, 1674), Barchetti (1801), Miller (1807), and James (1808).

Perspiration. See Skin.

Perth, the county town of Perthshire, on the right bank of the Tay, is 43 miles NNW. of Edinburgh, 22 WSW. of Dundee, and 92 NW. of Glasgow. The beauty of its surroundings—the noble river; the two wooded heights, Moncreiffe and Kinnoull Hills, 725 and 730 feet high; and, away to the north, the Grampians—makes the 'Fair City' worthy of the name. A handsome nine-arch bridge (1772; widened 1871), 840 feet long, and stretching over a waterway of 500 feet, leads to the suburb of Bridgeend, where Ruskin spent much of his childhood, on the east bank of the Tay; along the west bank are beautiful public parks, the North and South Inches, 98 and 72 acres in area. St John's Church, whose restoration was undertaken in 1891, is the only old building—a cruciform Decorated pile, with an earlier central square tower. Other edifices are St Ninian's Episcopal Cathedral, a Early Middle Pointed structure, by Butterfield; the Tudor municipal buildings (1879), the Grecian county buildings (1819-67), the city hall (1844), the infirmary (1857-69), and the penitentiary and general prison for Scotland (1812-59), besides which may be noticed the water-works (1830-80), two museums, the Albert statue (1864), and the auction-mart (1876). Railways have largely diverted the river-trade; and dyeing is now the leading industry, with manufactures of ink, gauge-glasses, hosiery, iron, beer, &c. A royal burgh since 1210 or earlier, and taking precedence of all others save Edinburgh, Perth returns one member.

Pop. (1831) 19,238; (1861) 22,230; (1891) 29,599.

Perth, or St John's town, as it was formerly called, has a wealth of historic memories—the bloody encounter on the North Inch between sixty clans Chattan and Kay (1566); the murder of James I. (q.v., 1457); Knox's thundering sermon against idolatry in St John's (1569); the Gowrie Conspiracy (q.v., 1600); and Montrose's victory of Tippermuir (1644); besides sixteen ecclesiastical councils and fourteen parliaments, and visits innumerable from royal personages, including both the Pretenders and Queen Victoria. James, fourth Lord Drummond, was in 1605 created Earl of Perth; in 1607 by the Jacobite fourth earl (titular Duke of Perth), and restored in 1833 to George Drummond, sixth De Selincourt.

The Five Articles of Perth, memorable in the ecclesiastical history of Scotland, were agreed upon in a meeting of the General Assembly, convened at Perth, by command of James VI. in 1618. They enjoined kneeling at the Lord's Supper, the observance of Christmas, Good Friday, Easter, and Pentecost, and confirmation, and sanctioned the private administration of baptism and of the Lord's Supper. Highly objectionable to the Presbyterians as having been adopted in mere compliance with the king's will, they yet were ratified by the parliament, and enforced by the Court of High Commission. They became one of the chief subjects of that contention between king and people which produced results alarming and sad for both in the subsequent reign. The General Assembly of Glasgow in 1638 declared that of Perth to have been 'unfree, unlawful, and null, and condemned the Five Articles.

See Perth Memorials (1806), Maidment's Chronicle of Perth (Maitland Club, 1831), and works by Penny (1806) Lawson (1847), Peacock (1849), and J. Wilson (1860).
PERTH, the capital of Western Australia, occupies a picturesque site on the north bank of the Swan River, 12 miles from the sea. Its port, at the mouth of the river, is the headquarters of banking for the colony, and the centre of the principal railway lines, including the Great Southern Railway to Albany. The most important building is the Government House, the Protestant (1888) and Roman Catholic cathedrals, the university, the state library, the institute and museum, and the governor's residence. 

Perth, capital of Lanark county, Ontario, on the Black Water, 141 miles by rail, SW. of Montreal, contains mills and manufactories of machinery, leather, woolens, &c. Pop. 2467.

Perth Amboy, a port of entry of New Jersey, on the Kill van Kull, 26 miles by rail SW. of New York. There is a steam-ferry to Tottenville in Staten Island. Pop. (1900) 17,699.

Perthes, FRIEDRICH CHRISTOPH, German publisher, was born at Rudolstadt, 21st April 1772, and learned his business in Leipzig. In 1810 he started the National Journal, which enjoyed the patronage of the most influential writers of the day, and took an active personal part in resisting the establishment of French authority in Hamburg and Germany. Having built up his business again during the first years of peace, he removed in 1821 to Gotha. There his greatest work was the publication of works on all European nations, edited by Heeren, Ubert, and Giesebricht. He died at Gotha, 18th May 1843. See Life (6th ed. 1872; Eng. trans. 1878) by his son Clemens Theodor. —JOHANN GEORG JESTER.

Perthes (1740-1816), an uncle to Friedrich, established a publishing-house at Gotha in 1785, which has acquired in the hands of his sons a great reputation as a geographical institute; it issues Petermann's Mitteilungen, Steiler's Atlas, numerous books of travel and geography, and the Almanack de Gotha.

Perthshire, the fourth largest county of Scotland, bounded by Inverness, Aberdeen, Forfar, Fife, Kinross, Clackmannan, Stirling, Dunbarton, and Argyllshire. Its greatest length, from east to west, is 77 miles; its greatest breadth, from north to south, 68 miles; and till 1891 its area was 290,353 acres, of which 28,274 were water. In that year no fewer than eighteen alterations were made by the boundary commissioners, Perthshire receiving eight small enclaves from Ffarar, Fife, Kinross, and Stirling shires, whilst giving off to the last three lands, like nupts, including the Culross and Tulliallan portion (13,125 acres). Partly Lowland, but mainly Highland (Strathmore the dividing line), it is called by Scott 'the fairest portion of the northern kingdom;' and such, indeed, it is, with its mountains and glens, its riverine, lakes, and fertile valleys, and fertile pastures. At the chief rivers are the Forth and Tay, the former receiving the Teith, Allan, and Devon, the latter the Tummel, Lyon, Isla, Braan, Almond, and Earn; whilst amongst uplands of the county are the Lochs Tay, Ericht, Earn, Rannoch, Lydoch, Katerie, Auchterarder, and Menteith. In the south rise the Ochils, with Dunnyatt (1375 feet) and Blairdenon Hill (2072); in the south-east the Sillaw Hills, with Dun-sinane (1012) and King's Seat (1225); and the Highland mountains are largely occupied by the Grampians, of whose forty-six summits exceeding 3000 feet may be mentioned Ben Lawers (with cairn, 4004), Benmore (3843), Ben-y-Gloce (3671), Schiehallion (3547), Ben Vorlich (3224), Ben Ledi (2875), Ben Vrackie (2757), and Ben Venue (2933). The soil is extremely varied, in places of great fertility—e.g., in Strathearn and in the Cars of Gowrie, which skirts the north side of the Tay's estuary; but barely a fifth of the entire surface is in tillage, the rest being pasture, woods, deer-forests, mountain, and desolate moorland, such as the Rannoch, etc. The woods cover nearly 100,000 acres; and the annual rental of the Perthshire deer-forests, grouse-moors, and rod- and net-fishings exceeds in some years £70,000. Ancient divisions were Athole (N.), Rannoch (NW.), Breadalbane (W.), Balquhidder (SW.), Menteith (S.), Perth (SE.), Gowrie (E.). Stirling (central). The county since 1885 returns two members, one for the eastern and one for the western division; and Perth itself is a parliamentary burgh. Other towns and villages are Aberfeldy, Abernethy, Auchterarder, Birnam, Blair-Athole, Blairgowrie, Callander, Comrie, Comar, Angus, Crieff, Doune, Dunkblane, Dunkeld, Pitlochry, Scone, and Stanley. The Roman camp at Ardclach is a famous antiquity; and Perthshire contains the battlefields of the Grampian, Tippelin, Killiecrankie, and Sheriffmuir; whilst it possesses memories of Bruce, Queen Mary, the Earl of Royston, Bob Roy, Burns, Scott, Lady Nairne, Wordsworth, and Queen Victoria. The mansions, which are very numerous, include Taymouth, Drummond, and Blair castles. Pop. (1861) 125,583; (1881) 142,166; (1891) 129,007; (1891) 120,184, of whom 14,150 were Gaelic-speaking.

See separate articles on many of the above-named places; also works by Drummond (1879), Marshall (1880), Hunter (1888), and Millar (1890).

Pertinax, HELVIUS, Roman emperor, was born, according to Dio Cassius, at Alba-Pompeia, a Roman colony of Liguria, August 1, 126 A.D. He received a good education, and, entering the military service, rose through the various grades till he obtained the command of the first legion, at the head of which he signalled himself in Rhedia and Noricum against the native tribes. In 179 he was chosen consul, aided to repel the revolt of Avitus in Syria, and was governor successively of the provinces of Moesia, Dacia, and Syria. The Emperor Commodus sent him to take the command of the turbulent legions in Britain, who against his will proclaimed him emperor; though the senate recalled him, and was appointed pro-consul of Africa, prefect of Rome, and consul (a second time) in 192. On the death of Commodus his assassins forced Pertinax to accept the purple, which with great hesitation he did; but, in spite of his promise of a large donation, he was unable to gain over the pretorian guard. His accession was, however, hailed with delight by the senate and people, who were rejoiced to have as ruler an able captain instead of a ferocious debauchee; and Pertinax encouraged his soldiers by an unparalleled display of lenity in his intention of carrying out an extensive series of reforms, having reference chiefly to the army, in which he hoped to re-establish the ancient Roman discipline. Unfortunately for his reforms and himself, he was overthrown by a band of the rebellious pretorians, two months and twenty days after his accession, and, disdaining to flee, was slain, and his head carried about the streets of Rome in triumph.

Perturbations, in Physical Astronomy, are the disturbances produced in the simple elliptic motion of one body by another about the same by the attraction of a third body, or by the perturbations of the principal body. Thus, for instance, there were no bodies in space except the earth and moon, the
April there is usually constant dryness on the coast, from June to September the sky is obscured for weeks by mist, sometimes accompanied by drizzling rain. The maximum temperature is about 78° in summer and 60° in winter. When it is hottest and driest on the coast it is mining heavily in the Andes, and the rivers are full. When the rivers are lowest, muds and gours, carrying a weight of about 100 lb. Alpacas have always been prized for their long and soft wool, and are tended with great care, being kept in large flocks. The other animals of the Peruvian Sierra are the guinea pig, the capybara, the chinchilla, a native dog, and a fox. The largest bird is the condor, and there is another bird of the culture tribe called deckonari. Partridges, called yuta, and plovers are met with on the lofty plateaus.

The large and handsome geese called huachinua and
hualatá, several ducks, a gull, flamingoes, and other wading-birds frequent Lake Titicaca and the banks of the rivers. In the valleys there are many kinds of finches, and a great pink-footed finch has been seen at a height of 12,000 feet above the sea. 

The Montaña is the region of tropical forests within the basin of the river Amazon, including the wooded slopes of the eastern watershed of the Andes. It will be called the subtropical portion of the Montaña. This part of Peru is traversed by great navigable rivers. Here the Marañón and Huallaga, after separate courses of 600 and 400 miles respectively, unite and flow eastward to the Brazilian frontier. At 150 miles from their point of junction they are increased by the waters of the Ucayali, a great navigable river with a course of 600 miles. The forests drained by the Marañón, Huallaga, and Ucayali form the northern portion of the Peruvian Montaña. The southern half is watered by streams flowing down from the eastern Andes in the Sierra sections of Cuzco and Titicaca, and forming the Madre de Dios, a great tributary of the Bolivian river Beni, which has not yet been fully explored. The whole length of the Peruvian Montaña, from the Marañón to the Bolivian frontier, is 800 miles. In the sub tropical portion of this work, coconuts (Cocos nucifera), which sometimes extend for a distance of 60 or 80 miles before they subside into the Amazonian plain, are very important products. This is the region of the quinine-yielding cinchona-trees, and of the coca (Erythroxylon coca), and here coffee and cacao are cultivated. From the forest-covered plains come india-rubber, sarsaparilla, and a great variety of useful and ornamental timber. The fauna of the forests is naturally much more numerous and varied than that of the Sierra. Among the larger mammals, the llama and the alpaca are the largest in South America, and other species. Rats of several kinds are numerous, and there are flocks of coatis. The Andean bear, called ceñuari, is found on the upper borders of the forests. The puma also roams over the higher slopes, where he has an almost undisputed hunting-ground. Lower down there are jaguars, and several kinds of wild cats. Squirrels and other rodents swarm, and the heavy tapir, called danta or gran bestia, reposes in the soft marshy lands. Deer frequent the open ground, and herds of peccaries traverse the forests. The chief game-bird is the large guan or curassow, and there are several pigeons. Spoonbills, ibis, cranes, snipe, and curlew frequent the lagoons, while parrots, toucans, and other birds of bright plumage are innumerable. Snakes abound among the dense underwood, frogs raise their far-sounding voices through the night, and insects swarm in myriads. But the knowledge of the fauna of the Peruvian forests is still very incomplete.

Productions and Commerce.—The chief crops of the fertile valleys on the coast of Peru are sugar, cotton, and grapes. The exportation of sugar amounted to 45,000 tons in 1889, but it was double that figure in 1879, previous to the disastrous war with Chili. Peruvian cotton is chiefly grown in the valleys of Piura and Ica, and is a perennial. In 1889 the quantity of cotton exported from Peru was 30,000 bales of 910 lbs. The sugar industry has been a profitable industry ever since the Spanish conquest, in several valleys on the coast, and also in the Sierra. Good wine is made at Pisco and Ica, and also a famous spirit from the grape, called pisco and licor. The yearly production of grape wine is 17,000,000 imperial gallons, and of spirits 5,280,000 imperial gallons. Rice of excellent quality is raised in the coastal valley of Lambayeque, and there are establishments for preparing it at Lambayeque and Ferreñafe. In 1889 the crop was 24,750,000 lb. Olives are grown in the Tambo valley near Arequipa, and before the Chilian war mulberries, silkworms, and cochineal were successfully cultivated. The rocky islets and barren deserts of the coast were once the scene of immense wealth to Peru, but are so no more. The exportation of Guano (q.v.) from the Chineha Islands began in 1846 and ended in 1872, the supply being exhausted; and the nitrates of Tarapacá were seized and annexed by Chili, as the result of the war. The staple product of the Sierras of Peru are silver and wool. The silver-mines extend along the whole length of the cordilleras, and are worked here and there; the great centre of mining industry being at Cerro Paseo. In 1877 the Cerro Paseo mines produced 1,457,392 oz. of silver, and there are others of equal value round Puno, in the south of Peru. In the above year the value of exported silver was £575,000; of copper, £330,000. Up till 1891 there were no later returns; in 1894 the total mineral output was valued at £450,000. There are rich gold-washings in the Caravaya province.

Mollendo is the principal port for the export of wool; but wool is also shipped from Salaverry, Paesamayo, and Chala. There are no reliable returns of the quantity and value. From the Montaña the exported products are cinchona and sarsaparilla. The exportation of cinchona (q.v.), 1874, was 604 lb.; in 1890, 1,000 lb. A quantity of sarsaparilla was exported in 1890, coffee of the finest quality, cacao, tobacco, india-rubber, sarsaparilla, and some other medicinal roots. Maize is also exported to Chili, and large quantities of wheat are imported from Chili and the United States.

Public Works.—The system of railways (911 miles in 1897) consists of several short lines in the coastal valleys—from 20 to 80 miles in length, constructed to bring the produce down to the seaports—with two long trans-Andean lines. The first of these, from Lima to Callao and the Port of Callao, and from Lima to Jania, is to be 136 miles long, and was commenced in 1870. It threads the intricate gorges of the Andes by a winding path along the edges of precipices, through tunnels, and over bridges that seem suspended in the air. It tunnels the Andes at an altitude of 15,645 feet, and the bridge of Verrugas (q.v.), finished in 1891 in succession to one destroyed by a flood in 1889, is 250 feet high, and spans a chasm 580 feet wide. Of this railroad 87 miles had been completed at a cost of £4,625,887. The other great line across the Andes connects the port of Mollendo with Puno on the shores of Lake Titicaca, passing through Arequipa. The summit is crossed at a height of 14,660 feet, and the line is 346 miles long. In 1874 steamers were first launched on Lake Titicaca. In order to supply the port of Mollendo with water a pipe has been laid alongside the line from Arequipa—for a length of 85 miles, discharging 433,000 gallons in twenty-four hours—the longest iron aqueduct in the world. The construction of these great public works, chiefly between 1868 and 1872, involved the finances of Peru in grave difficulties. Previously the debt mainly incurred during the war of independence, was £4,400,000, the interest of which was paid from the proceeds of the guano. But by 1872 the debt had been increased to £49,000,000, requiring an annual sum of £5,400,000 to pay the interest. The payment of this interest was made in 1873, but from 1874 interest had been paid since 1849. The financial difficulties culminated with the disastrous war with Chili, when the nitrates of Tarapacá, the chief resource of Peru, fell into the hands of the enemy. 

The People.—The Peruvian population is composed of the aboriginal Inca Indians, whose language, called Quichua, is still spoken in the Sierra. The Incas had attained to a high state of civilization before the arrival of the Spaniards. They cultivated many of the arts, and had some knowledge of astronomy. They had domesticated...
the llamas and alpacas, had brought under cultivation maize and quinoa, potatoes and many other edible roots, underground mining and the working of metals, and excelled as masons, weavers, potters, and farmers. They brought the science of government to a high pitch of perfection. The Incas composed songs and dramas; and as soldiers their skill and prowess enabled them to conquer conquerors. Throughout the centuries of oppression under Spanish rule have deteriorated the character of the Inca Indian, but he is still industrious and honest, and retains some of the virtues of his ancestors. The wild Indians of the Andes are not the Inca, and the Indian civilization has been reduced. The cultivation of the Inca period has also been reduced. The cultivation of the Inca period has also been reduced.

The department of Puno comprises the basin of Titicaca and the rich province of Caravaya in the Montaña. Its capital, on the north-western shore of the lake, owes its origin to the rise of silver mining in the surrounding hills. The other cities of the department are Lampa and Chucuito.

Church and Education.—When the Spanish conquests brought new ideas and beliefs. This destructive system was resolute and well organised, and was in great part successful. Education and literature were in the hands of an intolerant priesthood. The cruel Valverde murdered Bishop of Cuzco in 1554. The archbishop of Lima was murdered in 1541, and the bishoprics of Guanama, Arequipa, and Trujillo were added in 1612 and 1614. Swarms of clerics followed the bishops, numerous monasteries were founded, and an inquisitorial system of catechising and punishing penetrated into every village and hamlet in the land. Schools were established in the towns for the education of young Spaniards and half-castes; and the University of San Marcos at Lima, the most ancient in the New World, was founded in 1551. It had professorial chairs of medicina, philosophy, rhetoric, Latin, mathematics, and astronomy, and it produced men of ability in every branch of thought. The language of the Incas. In 1793 there were 313 doctors of San Marcos. The college of San Carlos at Lima, which still flourishes, was founded in 1770, and the school of medicine was established in 1792. At Cuzco the university of San Pedro was founded in 1565 by Viceroy, Prince of Esquilache, also endowed the college of San Borja there, for the education of noble Indians. At Arequipa the college of San Giovanni was founded in 1616, for teaching Latin and theology, and similar colleges were founded at Trujillo in 1621 and at Guanama in 1629. These universities and colleges produced historians and other writers of eminence, the best known in Europe being Dr. Peralta y Barreneu, who wrote Lima Fundada, and Leon Pino, the author of a well-known library. In later times, and after independence, Peru has produced many meritorious writers, including the learned Dr. Vigil, the antiquary Rivero, the historians Lorente and Palma, the geographers Paz Soldan and Uanune, the poets Marquez, Althea, and 'Juan de Arona,' and the biographer Mendiburu. Additional colleges have been established in the large towns, and numerous schools in the villages, within the last fifty years. Besides the university of Lima there are two lesser universities at Cuzco and Arequipa. There are high schools maintained by government in the capitals of the provinces (originally) compulsory for both sexes, and is free in the municipal public schools, yet but a fraction of the population has attended any school.

History.—From very ancient times there were agricultural communities in the Sierras of Peru, and finally in the art of weaving, and in the cultivation of peaceful. They had brought under cultivation, and the animals they had domesticated, are among the most important of the great antiquity of Peruvian civilisation. Eventually all the people of the continent became one empire, and the Incas, in the course of some five centuries, developed a highly centralised system of government. Civilisation never attained to such a height among any other of the indigenous races of America. The Incas attempted the administration of the coast of Peru, containing the celebrated ports of Lima, Chalca, Siema, and Tinta. The department of Puno comprises the basin of Titicaca and the rich province of Caravaya in the Montaña. Its capital, on the north-western shore of the lake, owes its origin to the rise of silver mining in the surrounding hills. The other cities of the department are Lampa and Chucuito.
tion of a purely socialist government, and their attempt was unsuccessful. The great Inca Huayna Capac died, after a long and prosperous reign, at about the same time that the Mapocho Peruwamo, a leader of the Mapocho Peruwamo, was executed. On his death there was a war of succession between his two sons, who had just terminated in favour of Atahualpa when Pizarro (q.v.) landed a second time and marched into the interior. Peru was soon overrun by the Spanish, and the beneficial rule of the Inca's came to an end. But at the time of the assassination of Pizarro the presentations of Las Casas (q.v.) respecting the cruel treatment of the Indians had obtained a hearing, and the "New Laws" were promulgated. The grants conceded to the conquistadores were not to be hereditary, all men who had been engaged in civil wars were to be deprived, and personal service from Indians was forbidden. Blasco Nuñez Vela was sent out to Peru as viceroy to enforce these reforms. He landed in 1544, and proclaimed the "New Laws." The Spanish conquerors were thrown into a state of exasperation and dismay, and appealed to Gonzalo Pizarro (q.v.) to leave his retirement and protect their interests. The result was that the viceroy was defeated and killed, and Gonzalo virtually became governor of Peru. But he was not recognized by the Spanish government, and the viceroyalty went to Chile. Gasca was despatched to Peru, with a commission to restore order. Gonzalo Pizarro was defeated near Cuzeo, and beheaded on the battlefield. Gasca reversed the humane legislation advocated by Las Casas, and made a nasty distribution of grants to his followers. The announcement of his awards caused much discontent, but Gasca hurriedly sailed for Spain in January 1550, leaving the country in a most unsettled state, in the hands of the four judges who were his colleagues. He had arranged that the Spanish viceroy of Peru and the Indian should be promulgated after he was safe out of the country. This gave rise to a formidable rebellion, led by Francisco Hernandez Giron. The judges made head against it, but it was not put down until two pitched battles had been fought, and Giron had been beheaded at Lima in December 1554.

The Marquis of Cañete arrived as viceroy of Peru in May 1555. His policy was to employ the unquiet spirits among the Spanish settlers on expeditions of discovery into unknown regions, and to treat the natives with liberality and justice. During the five years of his government he restored order among the conquerors, and established the heir to the Incas in a dignified retirement. But it was Don Francisco de Toledo, the viceroy from 1559 to 1580, whose legislation finally fixed the colonial policy of Spain in this part of the New World. He reversed the kindly treatment of the ancient dynasty which had distinguished the Marquis of Cañete, and unjustly beheaded young Tupac Amaru, the last of the Incas, at Cuzco in 1572 and beheaded his men. His legislation is well known in the system of the Incas. His elaborate code, called the "Libro de Tassas," was the textbook of all future viceroys. He fixed the amount of tribute to be paid by the Indians, exempting all males under the age of eighteen and over that of fifty from the tribute, assigning others to the different missions, assigning them magisterial functions, and the duty of collecting the taxes and paying the money to the Spanish officials. But he enacted that one-seventh part of the population of every village should be subject to forced labor, generally in the same year. This was called the Mitma system. It was the habitual infliction of the rules established by Toledo, and the abuse of the Mitma, which caused all the subsequent misery and the depopulation of the country. Compliance with the continual demand for treasure from Spain, a demand which was insatiable, was incompatible with humane treatment of the people. For more than a century the Indians perished, and Peru toiled and died. At length their sufferings became intolerable. They rose as one man in the autumn of 1780, and a descendant of the Incas, taking the revered name of Tupac Amaru, placed himself at their head. After a long and formidable resistance the insur- rrection was subjugated, and the last of the Incas was put to death under circumstances of revolting cruelty. But he did not die in vain. In his fall he shook the colonial power of Spain to its foundation. From the cruel death of the Inca Tupac Amaru may be dated the rise of that feeling which ended in the expulsion of the Spaniards from South America. Some of the demands of the Incas were conceded soon after his death. He was the foremost pioneer of the independence of Peru. The desire for liberty among Peruvians of Spanish descent had its birth in Lima; but Lima was the residence of the viceroy. Here the power of Spain was concentrated. Consequently it was in the more distant colonies of Buenos Ayres, Caraccas, and Chili that insurrectionary movements first broke out and that independence was first secured.

At length a fleet under Lord Cochrane (see DUN-DONALD) equaled the Spanish fleet, and the campaign of the Argentine General San Martin to Peru with troops, and the independence of the land of the Incas was proclaimed at Lima on the 28th of July 1821. Another liberating force, from Columbia, under General Bolivar, embarked at Guayaquil, and when he arrived at Lima, in September 1822, San Martin retired. The Spanish viceroy, La Seru, with his army, retreated into the interior, and the patriots followed on his heels. On 9th December 1824 the decisive battle of Ayacucho was fought, the battle of the century, and the independence of Peru was freed. They were brought to a free republic. Bolivar and his Colombians left the country in 1826, but it was eighteen years before the government became settled. In August 1829 General Gamarra, a native of Cuzco and a hero of Ayacucho, was elected president of Peru, but at the end of his term of office there were troubles which culminated with an attempt to form a Peruvian Confederation under General Santa Cruz. This was defeated by Peruvian mal-contents, aided by a Chilian army, the cause of Santa Cruz destroyed, and the documents were examined after the decisive battle of Yungay on January 20, 1839. Gamarra again became president, the confederation was dissolved, and a constitution was proclaimed. But Gamarra fell in a deplorable war with Bolivia, and the contentions of his officers caused a succession of civil wars until 1844.

At length a man arose who restored peace to the distracted country. Ramon Castilla was a native of Tarapaca, and was a veteran of Ayacucho. He was brave as a lion, prompt in action, and beloved by all. At the end of the war he was elected president of Peru, and he held the office from 1844 to 1850, and again from 1856 to 1866, during a long period of peace. He was elected constitutional president of Peru in 1844, and ten years of peace followed. Castilla commenced the payment of interest on the foreign debt in 1849. A revised constitution was promulgated in 1856, and the leagues were reformed, and the constitution of 1856 was promulgated in office in 1862, and died in 1866. The next important event was the election of Colonel Balta. This president held office from 1862 to 1872, during which time public works were undertaken on a gigantic scale with the aid of American capital. Don Manuel Pardo, a scholar and a man of letters as well as a statesman, was the first civilian president. He held office from 1872 to 1876, and inaugurated a policy of retrenchment. But it was too late to save the credit of the state, and the payments of
Chronicle of Calahue, and the Memorias de los Vireyes; also the more recent works of Stevenson, the Chilian Amir, González; the Memoirs of General Miller (London, 1858), the Autobiography of the Earl of Dundonald, and the great biographical work of General Mendiburu; for the war with Chili, narratives from the Chilian point of view by Arana and Miranda, from the Peruvian by Paz Soldan, and the present writer's History of the War between Peru and Chili (1883). For the geography, the Geografía del Perú, by Paz Soldan, and the present writer's History of Peru (Chicago, 1892).

Peru, (1) a city of Illinois, at the head of navigation on the Illinois River, 110 miles by rail WSW. of Chicago. It is a foundry, a plough-factory, and several ice-houses. Pop. (1900) 6863. — (2) Capital of Miami county, Indiana, on the Wabash River, and on the Wabash and Erie Canal, 75 miles by rail N. of Indianapolis. It mills and factories produce woolens, bagging, furniture, basket-ware, &c. Pop. (1900) 8403.

Perugia, a city of Italy, stands (1706 feet above sea-level) on the right bank of the Tiber, 11 miles E. of the lake of Perugia (anc. Lake Trasimene), and 127 miles by rail N. of Rome. It is surrounded with walls pierced by gates (one of them very old). The broad Corso, which contains the handsomest edifices, unites two squares, in one of which stands the Gothic cathedral of St Lawrence, dating from the end of the 13th century, and adorned with many paintings, carvings, &c. The church of St Dominic (1362) contains the tomb of Pope Benedict XI, by Giovanni Pisano, and stained windows (1402); the remarkable church of St Peter (11th century) has granite pillars, and pictures by Raphael, Perugino, and the masters of the 15th century; besides a number of noble and picturesque monuments. In the cathedral square stand also the Gothic municipal palace (1281), with the valuable art gallery, especially rich in productions of the Umbrian school; the great fountain, adorned with statues by Niccolo and Giovanni Pisano; the statue of Pope Julius III (1555), described in N. Hawthorne's Marble Faun; and the old money-changers' bull (1453-57), decorated with some of Perugino's best works. In the vicinity of the city a number of Etruscan tombs were discovered in 1840; they contain several rich bronzes, bronze statues and bronzes, and many lustrous ornaments. Pop. (1881) 17,365. Perugia, the ancient Perusia, was one of the twelve Etruscan republican cities. It was besieged and captured by the Romans in 310 B.C., and again in 40 B.C., and by Tullia (349). At different periods it was the residence of thirteen pontiffs elected to the popes, especially after the middle of the 16th century; at other times it was independent, though in the power of native despots. In the 16th century it became the centre of the Umbrian school.

For the history of the Inca and their civilization, see the works of Cieza de Leon, Molina, Balboa, Garcia de la Vega, Montesinos, and Acosta, all, except Molina, translated into English Society; also Rivero's Antiguedades Peruanas (with Von Tschudi, Vienna, 1851), of which an English translation appeared afterwards at New York; and the histories of Roderic Romeu, Lobo, Presvy, Helpes, and Wissow (vol. I.), and the travels of D'Orelliny, Squier, Wiener, and Reiss and Stübel. For the Conquest, see, besides Robertson, Prescott, and Helpes, the narrative of Xaviera, and the works of Hakluyt, See, and the writings of Herrera, Gimara, Zanate, Pedro, Pizarro, and Fernandez. For the period of the vicereys, see Figuero's Life of the Marquis of Cadiz, the
of painting. In 1890 it was made a part of the kingdom of Italy.

Perugia, Lake of. See Trasimene Lake.

Perugino, a celebrated Italian painter, whose real name was Pietro Vannucci, was born at Citta della Pieve in Umbria, in 1446, but established his residence at Perugia, where he painted pictures of the most important subjects, and also studied under Verrocchio at Florence. He executed important works, no longer extant, at Florence, Perugia (1475), and Cercato (1478). At home, whether he went about 1483, Sixtus IV. engaged him to paint the ceiling of the Sistine Chapel. The frescoes painted for 'Christ giving the Keys to Peter' is the best of those still visible—other than being destroyed to make way for Michelangelo's 'Last Judgment.' During his next sojourn at Florence (1486–99) he had Raphael for his pupil. Here he was fined for rivalry of the dissecting of the soul. In a somewhat too fond of money, repeating his works and leaving much of the execution to pupils. At Perugia (1499–1504) he adorned the Hall of the Cambio, with the assistance of Raphael and other pupils; but after 1500 he was visibly declined. In his next years, he went to Rome (1507–12), and there he painted frescoes for the Stanza di Luna, was the fresco relieved when Raphael was commissioned to substitute his works for those formerly painted on the walls and ceilings. The new school, with Leonardo da Vinci, Michelangelo, and Raphael, was now in the ascendant, and Perugino's popularity waned. He was again at Perugia in 1512, and painted a number of pictures there. He was painting frescoes in a church at Castello di Ponteuggio, near Perugia (one of which frescoes is now at South Kensington), when he was seized by the plague, of which he died in 1524.

Perugino's art was religious, though he is said by Vasari (biased in all regards by Michelangelo's contempt for Perugino) to have been an open debauchee of his senses. In his figures, very uniquely drawn, there is a peculiar tenderness of expression verging on faintheartedness; his execution was delicate, his colour admirable. But he is not remarkable for originality or intensity.

Peruvian Bark. See Cinchona.

Pescador Islands. See FORMOSA.

Pescchia, a fortress of Italy, a member of the Quadrilateral (q.v.), stands partly on an island in the Lake of Garda, 14 miles by rail W. of Verona and 77 E. of Milan.

Besides a strong citadel and an arsenal, there is a fortified camp. The fortress has played a prominent part in the warlike events which have taken place in North Italy, especially after the Napoleonic wars began down to 1859. Pop. 1655.

Peshawar, or Peshawur, a town of India, 184 miles from the north part of the district of Peshawar at 190 E. by S. of Kabul, and 276 by rail NW. of Lahore. Although a frontier town and occupying a strategic position of the utmost importance, its only defences are a mud wall and a small fort; but 2 miles west of the city are the cantonments, with a garrison of six regiments, a battery of Royal Artillery. The population in 1891 was 84,191, including the cantonments. Peshawar is the seat of extensive commerce between Afghanistan and India; gold, silver, lace, hides (all four from Bokhara), horses, mules, fruits, woolen and skin coats (all five from Kabul) being exchanged for English piece-goods, wheat, salt, rice, butter, oilseeds, oil, and sugar.—The district has an area of 2564 sq. m. and a pop. of 592,674; the division, an area of 8831 and a total pop. of 1,189,462.

Pesilto (Syriac pšlštd, 'the simple'), the Syriac Vulgate. See BIBLE, Vol. II. p. 129.

Pessimism is the doctrine that on the whole the world is less fortunate than good; and it necessarily means that the world is the worst possible of all conceivable worlds, as the fact of its being the verbal opposite to Optimism, the term employed to describe the Leibnitzian philosophy, would seem to imply; it means simply that the world is so bad that it would be better if it did not exist. Pessimism presents itself in a twofold aspect—(1) as a settled attitude of mind or permanent mood of feeling, and (2) as a philosophical system. The former springs out of the contemplation of the antagonism that exists in the world between natural laws and moral laws, between the world as it actually is and the world as it ought to be; it is the outcome of reflection, and is largely conditioned by individual temperament. Thus it is coeval with the dawn of conscious intelligence, and early found fit literary expression. The problem of the existence of evil, the connection between suffering and sin, is the burden of the ancient Hebrew Book of Job; and the Jewish thinker who wrote Ecclesiastes rings the changes upon the nothingness of life, and sums up his plaint in the hopeless refrain, 'Vanitatem humiliavit, saeculum est illud, nihil est vanitas.' Different forms of the same temper of mind are given utterance to with more or less of moral indignation in Innocent III.'s De Mineria Humanae Conditionis, and the satirical works of Juvenal and Carlyle and others. The same 'world-sadness' (Weltenschmerz), though expressed in more personal and passionate language, colours deeply the poetry of Omar Khayyam, Leopardi, Heine, and Byron; and the negation of the problem, 'Is life worth living?' forms an undercurrent in much of our best modern literature. But in the pessimistic temper, culminating in the persuasion of the nothingness and vanity of human life, has had more than an individual expression; it has entered deeply into the substance and structure of two of the world's greatest religious beliefs—viz. Christianity and Buddhism. The Christian and Buddhist worlds derive the doctrine that this earthly life is a vale of tears and woe, and that its pleasures and joys are illusory, being always accompanied with sin and suffering and evil, from which he can only escape by fixing his hopes upon a life in the world to come. Buddha's practical teaching (see BUDDHISM) turns in great part upon the desire to escape from the sorrows of life and the deceptive illusions of existence (mayâ). But here, in this latter point, the pessimistic
mood assumes something of a philosophical character. It also enters, though principally as an unconscious element, into the philosophical doctrine of the life of the soul, as Neoplatonism, in that they regarded man’s sensual (sense) nature as opposed and inferior to his intellectual. The medieval mystics (Eckhart) combined the religious with the philosophical tendencies of the mood that despiseth the earth, but not in a conscious, deliberately philosophic way. But it is only in the more recent times that pessimism has been elaborated into a philosophy or complete theory, in the systems of Schopenhauer (q.v.) and his successor, E. von Hartmann (q.v.). Schopenhauer is generally considered to be the father of philosophical pessimism, for he regards the world principle as an omnipotent, blindly struggling and striving Will, which is incapable of satisfying itself or of delivering itself from its eternal cyclic misery. Hartmann formulates as world principle the Unconscious, whose primal error, for which it eternally stumbles in the endless mercy of the world, was its kindling—just as Schopenhauer’s Will did—a light for itself in the brain, or the consciousness of organised life. Both philosophers build on the pain and misery and struggle which they see everywhere in the world, from earthwise position and the far movements to the farthest ones, through the endless struggle of organisms for existence to the acce suffering exhibited in the many forms of human passion, and chiefly of all in exalted passionate love or sexual desire (Romeo and Juliet, or Kabinett und Liebe of Schiller); and begins for the individual only in the far movement of the terrible, irrational, or non-logicial cosmic agency. It is extremely difficult to state shortly the metaphysical grounds of pessimism; they are far from being merely superficial, and may be said to be rooted in the old antitheses between nature and man, and between the individual and the world, which modern science has shown us what a small twig human life is on the great tree. Both Schopenhauer and Hartmann lay a firm hold on the fact (emphasised especially by Schopenhauer in opposition to Hegel) that not only the idea of the world, but our man must be used in replanning the world, but also Force, Impulse, Will, Strife. Thus in a sense they represent the substitution of the scientific or cosmic attitude towards the world for the merely introspective attitude of a Descartes or a commonsense thinker. It is not, of course, in the least to be assumed that what we call ‘naturalism,’ as opposed to speculation or supernaturalism, leads to pessimism, mental and spiritual facts being just as ultimate as chemical protoplasm. The full force of pessimism lies in the assertion that all the ends and aims of life are illusion, that life, in fact, brings only illusion; the illusion of illusions being man’s innate and inevitable belief that he is born to be happy and to have pleasure. There are here two main contentions: (1) All ends are illusory, even cosmic ends, for nothing is ever attained, as is always the case, seeing that there is no world—that which holds it together—is strife and change. Pessimism, that is, really denies teleology, as Darwinism does, in the old sense of the term. (2) In the case of the individual life there is excess of means and means and ends is said to be one of the most common causes of misery and pain. But there is no reason for despising the realisation of certain ends because there always arises a limitless number of new ends to be realised; of course we do not wish to limit the world process. Pessimism thus really comes to stake its case on the individual, which (let us say) to a certain extent we do immediately know. The natural man wants to fill infinity, to gratify all his desires, to embrace in himself all the ends of the world, and because he cannot do this, but even fails to get immediate ends gratified, he votes the world excerable. The pessimists in the end do not escape the all-embracing human standpoint of anthropo-centricism. To them the conscious thought is not, in the first place, to avoid the errors of metaphysics and ‘transcendental idealism.’ They examine man, and what they find to be true of man they predicate of the world: he ‘measures’ all things—is the microcosm. Still, we must concede that, if to man the world brings only illusion, if both the ends and the means of the world are illusion, the central position, then, of pessimism inevitably comes to be that living beings have as matter of fact an excess of pain over pleasure.

To this position the psychologist answers: (1) That pleasure and pain are not things that can be balanced. Both have an inclination to wear out, and they come also to a certain point of balance: feeling, which, though itself a constant element of experience, is only one element; and what we do as matter of fact measure and are conscious of is the amount of change or transition in our feeling, there being of course no absolute measure of amount of pleasure or painful feeling. (2) Even if by the help of memory and calculation, and observation and reflection (for there is really enormous difficulty in the matter), we allow ourselves to think of sums of pleasures and sums of pains (there are writers who say the phrases are the purest nonsense, and that if one attempts to measure such things—no ‘hedonistic calculus’ or universal method of measuring pain against pleasure, can be fixed upon. (3) Even supposing we had an estimate of pleasures and pains, it is not psychologically legitimate to regard feeling of any kind as the end of things. (4) There are actions which have a final value apart from their pleasurable character, although also as matter of fact the attainment of pleasure or pain. (5) It is only by absurd and never by individual index or measure (i.e. whether normal or abnormal), while there are absolute measures of action in the ends or things accomplished. (6) There are actions which have a final value apart from their pleasurable character, although also as matter of fact the attainment of pleasures or pains. (7) It is only by absurd and never by individual index or measure (i.e. whether normal or abnormal), while there are absolute measures of action in the ends or things accomplished.

If we ask the pessimist if there is any freedom or release from the ‘bondage of man,’ we are answered: (1) The light which the Unconscious Will has kindled for itself in the brain of man (pessimism has of course pronouncedly naturalistic side) confers on us at least one advantage; employing this light, we may for brief moments pause, and survey with pity the awful slavery and strife of life. In a word, artistic perception, the insight into things of the man of genius, of the exalted intellect, is freedom: art, asceticism, quietism, orientalism, and suchlike. (2) To the individual suicide is to be deprecated as the name of the selfish assertion of the Will to be happy, it is to be hoped that some day the human race will be educated enough to see the contemptible character of life, and let us say that suicide is one of the highest forms of the bowing wilderness of life. (2) While individual suicide is to be deprecated as the name of the selfish assertion of the Will to be happy, it is to be hoped that some day the human race will be educated enough to see the contemptible character of life, and let us say that suicide is one of the highest forms of the bowing wilderness of life. If we demur that it is, then, only the few who can be saved, we are told
that the lot of life is one; my life is the same as that in the plant or the planet, and there is, as matters at present stand, not the least fear that the 'will to live' will die out with the death of my life in quietism, agnosticism, and mysticism.

Then, contrary to Rousseau, I also say: (1) That it is not necessary to have a theory of the world in order to make action possible; no one lives because he chooses to live, but because he must, and this apart from the question whether a theory of life is attainable or already attained. (2) That it is not the children of this world who measured altogether by the expectations or equations of the individual as to his own happiness, and that therefore pessimism is overthrown with the rejection of empirical Hedonism or the theory of ethical conduct that makes happiness the end of the world (3) Pessimism has done good in rousing up the illusions to which an acceptance of the Hedonistic or the Epicurean ethical leads in theory and practice; it might be held in fact to give a negative account of man's perfection as consisting not in happiness for happiness' sake, but in the self-seeking self formed apart from man's desire or aversion to them, to the self-seeking self everything is foreign and negative, and also to the perfection-seeking self the ends of appetite and desire are illusory. The various forms of pessimism—the practical, the theoretical, the theogical, the positivistic—all of value as provisional accounts of the ethical end. The unconditioned sympathy with all forms of life inculcated in modern pessimism is a valuable contribution to ethical and class, history, and it appears to them that the world is incomprehensible. Both, in fact, tend to erect our ignorance of the world into a positive principle—the Uncon- scientious; but this is an old metaphysical fallacy. The world which the individual does know—i.e. the small sphere of it he knows—is not a sphere in which he cannot realise himself, but in Kantian language a moral kingdom; it will be able to educate his outer sphere. Thus it has been indicated how in a sense the pessimists are not to be held down to an Epicurean theory of morals, although they take their start from that.

BIBLIOGRAPHY.—Scobener’s chief work is the World as Will and Idea (Eng. trans. 3 vols. 1883-86). His ethic is contained chiefly in the fourth book, on the Ascension and Denial of the Will to Live. The appendices contain many exceedingly readable and vivid presentations of the main points of his system, so do many of the sections of the Parerga und Paralipomena. which has a high historical value. See translations of these in Mr. T. B. Saunders’ ‘Schopenheuer’s Series (1890 et seq.), Hartmann’s views are expounded in Philosophy of the Unconscious, which is also translated into English (1884). An admirable short account of his system in mind is that of Dr. A. Drews (Ed. v. Hartmann’s Philosophy, 1890). E. Wallace’s account of pessimism in the Westminster Review (1876) is eminently instructive, and has chief reference to Hartmann. An introductory treatise is also that of A. Tannert, Der Pessimismus und seine Gegner (1873). Mr. Sully’s Pessimism (1875) is an admirable and careful psychological criticism of pessimism. In addition, there is a large list of pessimistic literature. As an introduction to pessimism some account of Leibnitz’s philosophy ought to be read, and after Voltaire’s vigorous and drastic criticism (in his Essai sur le Prince) it is necessary to understand what Schopenheuer meant when he called optimism a ‘wicked and otiose shallow philosophy.’

The religious aspect of pessimism is touched on in an essay in Benthall’s Essays in Philosophical Criticism (1883), and also in Professor Tylor’s Modern Theories (1884).

Pestalozzi

Pestalozzi, Johann Heinrich, educational theorist, was born at Zurich, 12th January 1745. Eccentric, quixotic, eager to be an adjuster of social wrongs from his youth, he sought to realise his aims through educating the young. He shares with Émile great successes in mind. The honour of conceiving a method which is the cornerstone of all sound theories of primary education. From his day onward two ideas of education co-existed—the older one, applicable to the children of the classes; his, applicable to the children of the poor; the form of education was always improved by an encroachment of the latter upon its traditional domain. Pestalozzi, living during the period of the French Revolution and the wars of Napoleon, found in his disturbed country, in the misery inflicted by war, opportunity for the display of self-sacrifice, devotion to the oppressed, and that unselfish love of the children of the very poor which especially distinguished him. Illiterate, ill-dressed, a bad speaker, and a bad manager, Pestalozzi was unfit for the everyday business of life, and all his undertakings resulted in personal failure, there was no place in the admiration of Europe, and calling forth down to the present day in many countries, more especially in Germany, a crowd of disciples, who have carried out the principles of their master with great zeal. Thus it was that Pestalozzi’s works, even with the world, Pestalozzi’s personality was instinct with a loving sensibility; he awoke men to a sense of responsibility to childhood, and ushered the 19th century upon the stage of history as the educational age par excellence.

Pestalozzi’s life is one of likeness. Believing justly in the moralising virtue of agricultural occupations and rural environment, he chose a farm upon which to dwell with his collected waifs and strays as a father among his own. The farm Neuhof, in the canton Aargau, stranded on a faulty economic history after a five years’ struggle (1790), Pestalozzi withdrew then from practical life, to think out the educational problem. His Evening Hours of a Hermit was the first fruit of his meditations, and develops the following thoughts: before undertaking to educate men, learn to know him; the method whereby to educate man should be founded upon his own nature; in his nature are hidden the forces that draw out his faculties, exercise them; exercise, the instrument of education, connects the wants of our nature with the objects that satisfy them; rejoice in the fullness of your strength, make your education answer to your needs and to the inner call of your soul. Then came a social novel, Leonard and Gertrude, in four volumes. The former is a drunken stone-mason, the latter his wife, and a good one; the scene, a village given over to corruption. At last the minister, the schoolmaster, Gertrude with a few peasant-women, set about the reform of the village. This story created much attention, and was followed by a long period of literary activity on the part of its author. In 1798 he plunged into a rival school at Stanz. The picture he there makes of a moneyless, helpless, homeless lover of children, gathering homeless, helpless, children around him in an old conven in a township ruined by war, and set upon by a hostile and ignorant peasantry, is a picture of a noble picture. But that picture has proved too hard for Pestalozzi. At the end of eight months this establishment was broken up.

He next wended his steps to the people’s school at Berthoud (Burgdorf), in canton Berne, only to be ejected from it. On his return at the age of fifty-five, by the jealous and bigoted senior master. He knew then the bitterest pangs of poverty, and had even to keep away from church for want of clothes. In partnership with others, and
PESTALOZZI

under the patronage of the Swiss government, he opened an experimental school of his own, still at Berthoud. While there he published "How Grammar and Arithmetic Must Be Taught," and more fully developed the book. It is the recognised exposition of the Pestalozzian method, and sets forth that the development of human nature should be in dependence upon natural laws, with which it is the business of every good education to comply; in order to estimate them, we must learn first to understand nature, its general processes in man, and its particular processes in each individual; observation, the result of which is a spontaneous perception (intuition) of things, is the method by which all objects of knowledge are brought home to man.

This last affirmation, containing in essence the whole theory of so-called intuitional education, is the corner-stone on which the German Volkschule ("folk-school") is built, the guiding principle of numberless books written for children, and the subject of much controversy.

In 1805 Pestalozzi moved his school to Yverdon, where he drew upon the eyes of all Europe; in spite, however, of this his greatest moment of popularity and promise of worldly success, he entered upon a course of mistakes that led him to the downfall of his hitherto unexpected success. Deviating from the field of primary teaching, he applied his method in a large secondary school for the sons of notable Europeans attracted by his fame. His old incapacity in practical affairs brought the school down step by step till it closed in 1825, and Pestalozzi, aged eighty, distracted by the enmity of some of his former colleagues, sinking under difficulties of his own making, an object of mingled pity and respect, addressed to mankind the Song of the seven, a short educational prayer, and withdrew to Brugg (Aargau) where he died, 1827. Pestalozzi's books are all written in German.

See the article 'Pestalozzi' in the last edition of Quick's Biographers (1890); Morf, Zwei Biographie Pestalozzi (4 vols. 1864-89); De Guimpes monograph, translated by John Bascan (1880); Biografie Pestalozzi (New York, 1873); Leonard and Gertrude (Eng. trans. 1825); and, above all, Pestalozzi, Etude Biographique (1890), by J. Guillaume.

PESTH, or more correctly BUDAPEST, because since 1873 it has been united with Buda (Ger. Gutenbrunn, properly, is the capital of Hungary, and next after Vienna the third city of the Austrian-Hungarian empire. It stands on the Danube, Buda on the right bank and Pesth on the left, 173 miles by rail SSE. of Vienna. The two towns are connected by three bridges, a chain bridge (designed by Clark Brothers of England in 1842-49), 1280 feet long, uniting the busiest quarters of the two; another, built in 1827-75, a little higher up (1555 feet long); and a railway bridge near the southern end of both towns. Pesth is essentially a modern place, the growth principally of the last century. Its many fine streets and squares, the magnificent quays (3 miles long) beside the Danube being the favourite promenades; the buildings are chiefly noteworthy for their substantial appearance and frequently large size. Among other works may be enumerated the Jewish synagogue (the handsomest place of worship in the city); the parish church (1500) and the new Cathedral basilica (1831-68); the national museum (after 1850), containing collections of pictures, ethnography, natural history, mineralogy, botany, natural sciences, and plaster casts, and a library of 400,000 volumes and 63,000 MSS.; the academy of sciences (1809), containing a small collection of valuable old pictures, another of engravings and drawings, and a library of 60,000 volumes; the university (1635), established first at Tyrman, then at Buda in 1777, and lastly at Pesth in 1873, with 250 lecturers and 4000 students, equipped with excellent scientific laboratories, &c., and having nearly 200,000 volumes; the central library (1870-74), barracks, military academy (1872), slaughter-house (1870-72), industrial and commercial museums; and the magnificent new parliament houses and the palace of justice, completed for the millennium celebration in 1896.

Whilst Pesth stands on a plain, Buda straggles over small steep hills, and is backed by vine-clad slopes. It is a much older town, its central features being the castle in the citadel (1749-71), with the chapel of St Sigismund, in which are preserved the bones of King St Stephen; the church of the Benedictines; the bishop's palace, and the castle of St John (13th century); the palaces of the Honved ministry, the premier, and Archduke Joseph; the monumental tomb of G. Balas (1543-48), a Turkish saint; and the national lunatic asylum (1869-68).

Both towns are exceptionally well provided with baths, which are supplied both by the Danube and by numerous natural springs of mineral waters. Some of these last—Hunyadi János, Rakoczey, &c.—are exported in large quantities in bottles. The Artesian well in the castle and the waters already referred to under Artistic WELf. The water-works of Pesth were planned and built by the English engineer Lincle in 1868. Both towns possess an unusual number of philanthropic institutions, such as hospitals, asylums, &c. There is in Pesth a polytechnic (in Buda, 1840-72), besides the faculties of chemistry, architecture, and engineering, attended by 620 students, who are taught by 70 lecturers. A great number of learned and scientific societies flourish; and there is a music academy. The people are gay and fond of amusement, especially horse-racing (in the Aradi and other parks), and there are two beautiful public gardens, one in Pesth, the other on Margaret Island in the Danube, just above the town. The squares and streets of both Pesth and Buda are adorned with many statues of celebrated Hungarians. The following figure will show the extraordinarily rapid growth of Budapest: pop. in 1813 was 36,153; in 1833, 63,145; 1857, 116,683; 1869, 270,476; 1881, 530,767; 1891, 491,938. The last summation includes 11,000 military. The figure for 1881 embraced 75,794 in Buda and 67,253 in Pesth; amongst these were included 71,000 Jews. Budapest is the first manufacturing town of Hungary. The making of machinery and agricultural implements, wagons, and ships, the manufacture of spirits, tobacco, beer, gold and silver wares, cutlery, stationery, glass, and innumerable other articles, the distilling of corn, washing of wool, and printing are all prosecuted on a large scale; there is here a small-arms factory. But the commerce is even more important: immense quantities of corn are brought into the town, and exported and other products. To these are added wines, spirits, and oils-seeds and agricultural seeds, hemp, tobacco, plums (from Bosnia and Servia), honey and wax, bacon, hides, feathers, timber, coal, and manufactured wares are the principal articles of the extensive trade. Vast numbers of swine are fattened and killed in large yards just outside Pesth.

The Romans had a military colony on the site of the modern Buda. In the 13th century there existed here a flourishing German town, Old Buda. This was destroyed by the Mongols in 1241: but it continued to exist, and was regarded as the capital of the country from the middle of the same century down to its capture by the Turks in 1527. From 1541 down to 1686 the Turks held Buda, though it was besieged
half a dozen times by the Austrians. Pesth meanwhile was reduced to a heap of ruins; and it did not begin to recover until the first quarter of the 18th century. A century later it was rapidly outstripping its twin-sister Budin.

There are German books on Pesth by Hevesi (1873), Kincses (1892), Helesch (1880); and one in Hungarian, by Gerlóczy and Dulaško (3 vols. 1879).

Pestilence. See Epidemic, Black Death, Cholera, Plague, Sweating Sickness.

Petal. See Flower.

Petard, an instrument for blowing open the gates of a fortress, demolishing palisades, &c., consisting of a half-cone of iron filled with powder and ball; this was firmly fastened to a plank, and the latter and provided with hooks to allow of its being attached securely to a gate, &c. The petard, which was lighted by a slow-match, was superseded by the use of powder-bags. Large petards contained as much as 13 lb. of powder. See Bomb, and Shell.

Petavius, Dionysius, the name by which the great sixteenth theologian Denys Petan is usually known. Born at Orleans, 21st August 1583, he studied at Orleans and Paris, became a teacher in the university of Bourges in 1602, in 1605 entered the order of Jesuits, and 1621 was made professor of Theology in the university of Paris. This post he held long, but in 1640, retired and devoted himself to the completion of a remarkable series of works in philology, history, and theology. Of his 49 works among the best known are editions of Syneces (1611) and Epiphanians (1622); De Doctrina Temporum (1627); Tribulum Chronologicae (1628); Rationarium Temporum, an outline of universal history (1634); and De Theologica Dogmatibus, a history of doctrines (1641–50; new ed. by Thomas, 8 vols. 1864 et sequ.); besides polemical works against Grotius and Salmasius.

He died in Paris, 11th December 1652.

Petchenegs. See Russia, Vol. IX, p. 43.

Petchora, a large river of Russia, rises on the western slope of the Urala, flows north through the eastern parts of the governments of Vologda and Archangel, then south-east for 150 miles, and finally sweeping northwards into an estuary 30 miles wide and full of islands, falls into the Arctic Ocean, after a course of 1720 miles. It is navigable by boats for upwards of 700 miles. The country through which the river flows is thinly peopled and quite uncultivated; dense forests extend on both sides, and the character of the scenery is wild, sombre, and melancholy. See Seboohn's Siberia in Europe (1881).

Pechelia. This term is given to spots of a dusky crimson or purple colour, quite flat, with a well-defined margin, and unaffected by pressure, which closely resemble flea-bites. These spots result from a minute extravasation of blood beneath the cuticle. They occur mostly on the back, at the bend of the elbow, and in the groin. They indicate an altered state of the blood, and are characteristic of the disease called purpura; but are often symptomatic of very serious diseases, as of typhus fever, plague, septic, &c., &c. They likewise occur in very severe cases of small-pox, measles, and scarlet fever, when their presence must be regarded as indicative of extreme danger.

Peter, St, apostle, named originally Symeon (Acts, xiv. 14) or Simon, was 'of Bethsaida' (John, i. 44) on the Lake of Galilee, but during the public ministry of Jesus had his house at Capernaum, where he was one of the Four who brought his Mother and Brother to Jesus. Andrew, the household, including his mother-in-law and probably children (Mark, ix. 33, 36), his father was called John (John, i. 42; xxi. 15, 16, R.V.) or Jonas (Jonah), and the name by which he himself is known in Christian history is the Greek translation of that given him by Jesus (Cephas, Græcisised form of Aramaic kepha, meaning 'rock' or 'stone', Gr. Petra, nasse. Petros). He was a fisherman by occupation, and together with his brother Andrew was actually engaged in the pursuit of his calling on the Sea of Galilee when Jesus called both to be his disciples, promising to make them 'fishers of men.' For this invitation they had been prepared by previous acquaintance, formed perhaps for the first time when they were attending the baptism of John the Baptist (John, i. 40–42), and they both accepted it without hesitation. For the incidents recorded in the life of Peter as a disciple reference must be made to the four canonical gospels. It is plain, especially from the Synoptics, that he was regarded by Jesus with particular favour and affection. In many respects he was indeed an ideal disciple, warmly attached to his master, quick (on occasions at least) to apprehend new ideas, and ardent, energetic, and fearless in following them out.

This is seen most clearly at that most important crisis in the life of Jesus. The first time Peter appeared to the first to see and say 'Thou art the Christ, the son of the living God' (Matt. xvi. 16–18); and it is not without reason therefore that Matthew significantly heads his list of the apostles with 'the first, Peter.' The testimony of the twelve, and the leadership among the twelve Peter continued to hold. In the earliest extant account of the resurrection (1 Cor. xv. 5) it is stated that the risen Christ appeared first 'to Cephas, then to the twelve;' and in the Epistle to the Galatians the apostle Paul tells us that his first errand to Jerusalem after his conversion was 'to visit Cephas' (Gal. i. 18). In the Acts of the Apostles Peter was the first mover in the election of a new apostle in the room of Judas Iscariot; he was the spokesman on the rest of the day of Pentecost, and also when they were brought before the council; he was the judge who condemned Ananias and Sapphira; and, along with John, he was sent from Jerusalem to the Samaritans converts that they might receive the Holy Ghost; and he was the first to baptise a Gentile convert, taking a Frankish in the council or conference at Jerusalem, the result of which, though its events are somewhat differently related in Gal. ii. 1–10 and in Acts, xv. 4–29, was his acceptance of the policy of conciliation between the contending Jewish and Gentile parties. The date of this council cannot be accurately fixed, but no recent scholar has placed it earlier than 47 A.D. or later than 53 A.D. He afterwards came to Antioch and for a time worked in harmony with Paul, but ultimately the famous dispute arose (Gal. ii. 11–21) which in conjunction with other causes led to the termination of Paul's ministry in that city. Peter, however, seems to have remained in Antioch, and was afterwards regarded as the founder of its church. His subsequent history is very obscure. On any theory of the authorship of I Peter that text was written by the bearer of belief that his missionary activity extended as far as to Pontus, Cappadocia, Galatia, Asia, and Bithynia; and, on one interpretation of 1 Peter, v. 13 (which, however, has little probability), he also laboured in Babylon. Then the sufferer martyred is clearly John, xii. 18, 19, and is confirmed by the unanimous voice of ecclesiastical tradition; as to the manner of it, we have it on the authority of Eusebius (H.E. iii. 1, interpreted by some as resting on Origen) that he was impaled or crucified with his head downwards, and a tradition from the end of the 2d century invariably mentions Rome, and this also is most probably implied in the vague phraseology of Clemens Romanus (I Ep. v. 4). Another circum-
stance that makes somewhat for a residence, how-

er ever, brief, of Peter in Rome is his probable connec-

It may be taken as certain that Peter was not in

the Epistle to the Romans was written, if the 16th chapter of that epistle is to be accepted

genuine; and it is almost equally evident that

have been there when Paul was writing to the

Thus the comparatively late tradition which assigns him a continuous hishopic

ultimately to Peter in Rome in 16 A.D. to 67 A.D.

must be regarded as unhistorical. If he came at

all to Rome it can only have been after 64 A.D.

Of the duration of his stay we have no means

of judging.

The dispute between Protestants and Catholics as to

whether Peter was ever at Rome began as early as at

least as 1530, when Vehelin (Velenus) published his De-

monstratio contra Romanj papam primatum ssumendum; it was

answered by Bishop Fisher of Rochester in his Consilio

cum iimmiuisue Abbeclie Feloni. For the arguments cur-

rent in that and the following century, see Spanheim,

Disertatio de Acta profetise Petcri apostoli in urbe

Romana (1679). In later times the question has been the sub-

ject of numerous and diverse controversies; but not with

the same motives or entirely on the same grounds. The

recent discussions began with Baur, who has been fol-

lowed by Lipsius, Zeller, and others in a complete denial of

the apostolic authorship for the 'Peter Legend,' among

those who have sought to vindicate for it some

basis of truth may be named Crocher, Wieseler, Ewald,

Hilgenfeld, and Renan. For the apocryphal Acts of Peter and

Theodore, and the conclusion of the apostolical

Gospel according to Peter and the Revelation of Peter,

found in 1866-87 at Akhmim in Egypt, was published in

1892 by J. A. Robinson and M. R. James, and by others.

For the discussion of the Preface of Lucius, for his signature,瘕

also Hilgenfeld. And see Littledale's Petcris Claves

(1889). Lightfoot's Apostolic Fathers, part i. (2d ed.

1881); on the Catholic side, Allies, The See of St Peter

(2d ed. 1871); Dillingen's Petrus et the Church (3d Eng. ed. 1871); and Johann Schmid, Petrus

in Rom, where the literature on both sides of the question

is very fully given. On the whole subject of the history

and legends connected with the name of Peter the import-

ant work of Lipsius, Die apokryphen Apostelgeschichten

und Apostellegenden (1883-90), ought to be consulted.

Peter, THE EPISTLES OF, constitute two of the

seven canonical writings of the New Testament

which towards the beginning of the 3d century began to be spoken of as 'catholic' epistles.

Eusebius (H.E. iii. 3) tells us that 'as to the words of the apostle Peter, the first

is acknowledged as genuine. For this was used and

used by the fathers in their writings as an undoubted

work of the apostle. But that which is called the

second we have not indeed understood to be embar-

bled with the sacred books, yet, as it appeared

useful to many, it was studiously read with the

other scriptures.' Among the earliest witnesses to

the antiquity of the first epistle the first usually

cited is Clemens Romans, who is supposed to be

quoting from it when he uses the phrases 'this nar-

sing /right,' or 'clearly covereth a multitude of

sins.' It was known to the author of The Shepherd

of Hermes, and to Basilides; Papisa was acquainted

with it; and Polycarp used it largely; but it is not

mentioned as canonical in the Muratorian Canon.

Coming to the internal evidence, it claims to have

been written by the apostle Peter, by the hand of

Silvanus, from 'Babylon' (the elect who are

sojourners of the Dispersion in Pontus, Galatia,

Cappadocia, Asia, and Bithynia,' and in substance

it is a practical exhortation to a godly conversation,

particularly by reference to all constituted authorities,

in the practice of the dominant virtues and in

patience under persecution. The elders are ex-

cluded to feed their flocks, the younger to obey,

and all to be sober, watchful and constant in the

faith, resisting their adversary the devil. Through-

out it abounds with echoes of Pauline expressions

and modes of thought; in particular the exhorta-

tions contained in Rom. xii. 1-xxii. 14 have been

reproduced virtually verse by verse. This circum-

stance of its dependence on the Pauline writings is

one of the views which it was called 'Petrine' as

Baur, Schwengler, Keim, Lipsius, Pfeiderer,

Weizäcker, Hilgenfeld, Holtzmann) who fix its

date at some period after 112 A.D. in the reign of

Trajan, by whom formal proceedings were first

instituted against Gnosticism. They had confirm-

ation of their view in the use of the name 'Balthasar'

for 'Rome'; a use that seems to have been first

introduced by the author of the Apocalypse. The

second epistle claims to be by 'Symeon Peter'

(i. i). the associate of Paul (iii. 15), and a witness

of the resurrection (i. 17, 18); the expression 'four

apostles' (iii. 2, R.V.), on the other hand, is held by

many critics to be a confession of the author's non-

apostolicity. The evidence supplied by itself as to

its authorship has been variously interpreted, some

affirming and some denying that its thought, ex-

pression and vocabulary exclusively show that it

cannot have been written by the author of 1 Peter.

Its relation to the Epistle of Jude is also still under

discussion, but the weight of opinion seems to be

in favour of the priority of the latter. The external

evidence as to its existence down to the end of the

century is of very uncertain value. It is quoted quite

by Eusebius as saying that even in his day there

was some doubt as to whether it was by Peter.

The genuineness of both epistles is argued for (to

mention only two out of many weighty names) by Sal-

mon (Introduction to the New Testament) and by Weiss

(Entstehungsgeschichte, R. V.), the opposite view is taken

by Holtzmann (Entstehung, 1886), who may be consulted

for references to other authors, many of whom accept

the first epistle while rejecting the second. There are

comments or diffusions of Petrus and of Football

by Fritzsche; the latter is also edited by Hutter

(Meyer's Kommentar; Eng. trans., Lillie, and

Plumptre. Leighton's Practical Commentary on 1 Peter

is one of the classics of English theology.

Peter the Cruel. See Pedro.

Peter the Great. Peter I, Alexander-

dreievich, emperor of Russia, was the son of the

Dvortoiy by his second wife, Natalia

Narishkina, and was born in Moscow, June 7, 1672.

His father died in 1676, leaving the throne to

his eldest son, Feodor, Peter's half-brother.

This prince, however, died in 1682 without issue,

after naming Peter as his successor, to the exclu-

sion of his youngest brother, Ivan, who was weak-

minded. This step immediately provoked an in-

surrection of the 'stratelli' or militia, fomented by

Ivan's sister, the grand-duchess Sophia, who, after

a carnage of three days, succeeded in obtaining the

coronation (On. 1682) of Ivan and Peter as joint

rulers, and her own appointment as regent. Upon

Ivan's death the following autumn, the

the regency he was considered to have been

greatly neglected, but after this time he had the good

fortune to fall under the guidance of Lefort (q.v.),

a Genevese, who initiated him into the sciences and

the arts of civilization, and by showing him how

much Russia was behind the rest of Europe, influence

the whole of his future career. Lefort also formed a

small military company out of the young men of noble family who attended

Peter, and he rendered the czar himself all the while

as a model of rigid discipline. This course of train-

ing in all probability saved Peter from the mere

savage descent which his brutal and

passionate disposition and indomitable energy

inclined him to be; it also protected him from the

jealousy of his half-brother, the regent Sophia, who

though in the ascendency was discouraged in military exercises, studies,

and amusements. She, indeed, soon feared his

power, for Peter, contrary to her wishes, married

(1689), by his mother's advice, Eudoxia Feodorovna

by her error, for Peter, contrary to her wishes, married

(1689), by his mother's advice, Eudoxia Feodorovna
PETER THE GREAT

89

Lopukhin; and in October of the same year called upon his sister to resign the government. In the ensuing contest Peter was at first worsted, and compelled to flee for his life; but he was joined by the foreigners in the Russian service, with Patrick Gordon (q.v.) and Lefort at their head; and the situation, in the case of the contest, and was shut up in a convent, whence, till her death in 1704, she did not cease to annoy him by her intrigues. On October 11, 1689, Peter made his public entry into Moscow, where he was met by Ivan, to whom he gave the nominal supremecy, and had him increase the power for himself. Ivan only enjoyed his puppet sovereignty till 1696.

Peter's first care on assuming the government was to form an army disciplined according to European tactics, in which labour he was greatly aided by Gordon and Lefort, both of whom were military men. He also laboured to create a navy, both armed and mercantile; but at this period Russia presented few facilities for such an attempt, for she was shut out from the Baltic by Sweden and the Dutch, from the Black Sea by Turkey, and from the White Sea and the Arctic Ocean, by the solitary port of Archangel, available for the Russian navy. Peter, thinking the possession of a portion of the Baltic and of a free intercourse in that of accessible seaboard and port, declared war against Turkey, and took (1696) the city of Azov at the mouth of the Don, after a long siege. Skilled engineers, architects, and artillerists were now invited from Austria, Venice, Prussia, and Holland, to improve the Russian art of war; and by Peter the army further improved both in arms and discipline. Many of the young nobility were ordered to travel in foreign countries, chiefly in Holland and Italy, and to take special notice of all matters in connection with shipbuilding and naval equipment; others were sent to Germany to study the military art. Peter was eager to see for himself the countries for which civilisation had done so much; and, after repressing a revolt of the streitzi and dispersing them among the various provinces of Russia, he went to the Netherlands, in the train of an embassy of which Lefort was the head. In the guise of an inferior official of the embassy he visited the three Baltic provinces, Prussia, and Hanover, reaching Amsterdam, where, and subsequently at Zaandam, he worked for some time as a common shipwright, and to his practice of shipbuilding and kindred trades he added the study of astronomy, natural philosophy, geography, and even anatomy and surgery. On receipt of an invitation from William III. he visited England, and for three months, spent partly in London and partly at Deptford,laboured to assimilate all sorts of useful information. While in England he received the honorary degree of D.C.L. from the university of Oxford. He left England in April 1698, carrying with him English engineers, artificers, surgeons, artisans, artillerists, &c., to the number of 300, and next visited Vienna, for the purpose of inspecting the emperor of Austria's army, then the best in Europe. He was about to visit Venice also, when the news of a formidable rebellion of the streitzi recalled him to Russia. General Gordon had already induced the revolt, and Peter finally broke up the institution that had given him so much trouble. The Empress Eudoxia, who was suspected of complicity in the conspiracy, which had been the work of the old Russian or anti-regular, was arrested, and shut up in a convent, and the great reforms were begun. Peter put the press on a proper footing, caused translations of the most celebrated works of foreign authors to be made and published, and established naval and other schools. Ordinary arithmetic was first introduced, accounts having been previously kept by means of the Abacos (q.v.). Trade with foreign countries, which was formerly punished as a capital crime, was now permitted, or rather, permitted. A petition of the merchants, insisted upon. Many changes in dress and manners, and in etiquette were introduced and enforced on the people at large. Even the organisation of the national church could not escape Peter's reforming zeal.

In 1700 Peter, desirous of gaining possession of Carelia and Ingrin, provinces of Sweden which had formerly belonged to Russia, entered into an alliance with the kings of Poland and Denmark to make a combined attack on Sweden; but he was shamefully defeated at Narva, his raw troops being wholly unable to cope with the Swedish veterans. Peter was by no means disheartened, but quietly appropriated a portion of Ingrin, in which he laid the foundation of the new capital, St Petersburg, 27th May 1703. Great inducements were held out to those who would reside in it, and in a few years it became the Russian seat of war for the Baltic. In the long contest with Sweden the Russians were almost always defeated; but Peter saw that these reverses were administering to his troops a more lasting and effective discipline than the victories of the Dutch could confer on any other way. He had his revenge at last, in totally routing the Swedish king, Charles XII., at Pultowa (q.v.), 8th July 1709, and in seizing the whole of the Baltic provinces and a portion of Finland in the following year. His success against Sweden helped much to consolidate his empire and to render his subjects more favourably disposed towards the new order of things. After reorganising his army he prepared for strife with the Turks, who, at the instigation of Charles XII. (then residing at Bender), had declared war against him (see TURKEY). In this contest Peter was reduced to such straits that he despaired of escape. But, according to a somewhat doubtful tradition, the finesse and ability of his mistress, Catharine, extricated him from his difficulties; for she, in disguise, was received at Baku, with the utmost vigour. In 1712 his marriage with his mistress, Catharine (see CATHARINE I.), was celebrated at St Petersburg, and the offices of the central government were transferred to the new capital. His arms in Pomerania and Finland were victorious, and in 1712 the latter province was completely subdued. In 1716-17, in company with the czarina, he made another tour of Europe, this time visiting Paris, and returned to Russia in October 1717, carrying with him quantities of books, paintings, statues, &c. It was soon after this time that his son Alexei (q.v.), who had opposed some of his father's reforms, was condemned to death, and died in prison—apparently through having been repeatedly tortured. Many of the nobles who had been implicated in his troubles were arrested; and the nobility in general deplored his unseemly death. In 1721 peace was made with Sweden, which definitely ceded the Baltic provinces, Ingrin (now government of St Petersburg), and a portion of Finland with the islands off the coasts. In 1722 Peter issued a decree, in order to open up the Caspian Sea to Russian commerce, and secured three Caspian provinces along with the towns of Derbend and Baku. For
the last years of his life he was chiefly engaged in beautifying and improving his new capital and carrying out plans for the more general diffusion of knowledge and education among his subjects. In the autumn of 1724 he was attacked with a serious illness, and he died 8th February (28th January o. l.) 1725. Catherine succeeded him. The 'Testament of Peter the Great,' inciting the Russians to aim at domination in Europe, is a forgery, based probably on Lessar's Progrès de la Puissance Russe (1697), and, it may be, inspired by Napoleon.

See Russian Lives by Golovin (30 vols. 1797); and Ustralov (1863); English Lives by Barrow (new ed. 1881) and Schuyler (2 vols. 1884); and for a vindication of the authenticity of the 'Testament,' W. J. Thoms in the Nineteenth Century (1879).

Peter II. (Alexeevitch) of Russia, was the sole male representative of Peter the Great, being the son of the unfortunate Alexei (see above), and was born 23rd October 1715 at St. Petersburg. On the death of the Czarina Catharine I. he ascended the throne (1727). Menshikoff, his guardian, affianced one of his daughters to the youthful czar, but his power was overturned by the Dolgorouki family; and the czar was seized with smallpox, and died at St. Petersburg, January 29. 1730.

Peter III. (Ferdorovich) of Russia, grandson of Peter the Great (being the son of his eldest daughter, Anna, and Ivan Petrovitch, wife of the Duke of Holstein-Gottorp), was born at Kiel, 29th January 1728, and in 1742 was declared by the Czarina Elizabeth (q. v.) her successor on the throne of Russia. From the time of his being publicly proclaimed heir he lived at the Russian court; and in obedience to the wishes of the czarina he married Sophia-Augusta, a princess of Anhalt-Zerbst, who on entering the Greek Church assumed the name of Catharina Alexeevna. Peter succeeded Elizabeth on her death in 1762; and his first act of authority was to restore East Prussia to Frederick the Great (whom he admired extravagantly), and to send to his aid a force of 15,000 men. He also recalled many of the political exiles from Siberia. When arranging in 1762 a campaign to take Sleswick from Denmark a formidable conspiracy, headed by his wife, and supported by the principal nobles, broke out against him—a conspiracy which originated in the general discontent at the czar's liberal innovations, the preference he showed for Germans, his indifference to the national religion, and his servility to Frederick the Great. The czar was twice deposed and his crown: his wife Catharine was proclaimed as Catharine II. (q. v.); and Peter, who optimally abdicated, was strangled by Orloff and some of the conspirators on the 17th July 1762.

Peterborough, a city partly in Huntingdonshire, but chiefly in Northamptonshire, the latter part being the left or north bank of the river Nene at the edge of the fen-country. 76 miles N. of London and 42 N.E. of Northampton. Here, at Medeshamstede, in 655, the Mercian thane Saxulf founded the great Benedictine abbey of St. Peter, Paul, and Andrew, which, destroyed by the Danes in 870, was restored in 990, plundered by Hereward in 1069, and again burned down in 1116. Its noble church, the cathe-

dral since 1541 of a new diocese carved out of that of Lincoln, was built between 1118 and 1298, and thus, whilst essentially Norman, offers every variety of architecture down to the Perpendicular. It is 471 feet long, by 292 across the transept, and 81 high. The Early English west front (c. 1200-22) consists of three mighty arches, and 'is perhaps,' says Freeman, 'the grandest conception for a single feature which mediæval architecture has produced, a Greek portico translated into Gothic language.' Noteworthy also are the flat painted wooden ceilings of the 12th century, the portrait of 'Old Scarlett' the sexton (1496-1594), the blue slab inscribed 'Queen Catharine, A.D. 1536,' and the grave for twenty-five years (1587-1612) of Mary Queen of Scots. In 1643 Cromwell and his troops dined here. Balls to monuments, stained glass, and cloisters. In 1883 the fine central tower was condemned as unsafe; but it has been lovingly rebuilt, and in 1890 the cathedral was reopened after restoration. Of the abbots may be mentioned Ernulf, Bishop of Rochester (1115); and of the twenty-seven bishops, Lloyd and White the nun-jurors, Richard Cumberland, Archbishop Mgee of York, and Mandell Creighton the historian. Paley was a native. Two ancient gateways, the bishop's palace and the deanery (once the abbots' and prior's houses), and the chancel of a becket chapel (now a museum) make up the remaining

Peterborough Cathedral—West Front.

objects of interest. A training college for schoolmasters (1864), a grammar-school, the town-hall (1671), the corn exchange (1848), a cattle-market of five acres (1867), and the bridge over the Nene (dating from 1140, but in its present form from only 1872) may be mentioned. Peterborough is an important railway centre, has manufactories of agricultural implements, and carries on a large trade in malt, coal, farm-produce, &c. Incorporated as a municipal borough in 1874, it has returned two members to parliament from 1547 till 1885, and since then one. Pop. (1841) 6059; (1881) 22,984; (1891) 25,172.

See works by Gunton (1868; new ed. 1825), Britton (1828), E. A. Palae (1849), Davys (3rd ed. 1863), Sweeting (1869), and Poole (1881).
PETERBOROUGH

PETERBOROUGH, chief town of Peterborough county, Ontario, on the Otonabee River (here crossed by six bridges), 82 miles by rail N.E. of Toronto. It exports lumber and agricultural products, and manufactures flour, woollens, farming implements, machinery, furniture, canoes, &c.

Peterborough, Charles Mordaunt, Earl of, was born in or about the year 1638. All particulars of his boyhood, even to the place of his education, seem to have been lost. The first definitely recorded event in his life is his voyage as a volunteer in Sir John Narborough's expedition against Cadiz in 1652. He was a prominent engineer in his army. In 1655 he went into exile in Holland, in the course of which he learnt how to command, and, as it were, was educated. He returned to England in 1657, and joined his father, John, first peer of that title, who owed his services in assisting to bring about the Restoration, having died in 1675.

In the military operations which afterwards married Carey, daughter of Sir Alexander Fraser, and in 1678 started on another maritime expedition, this time apparently in the capacity of a passenger. Returning after a year's absence, he again visited the extremities of his father's dominions, and again sailed with the fleet sent under Lord Plymouth for the relief of Tangier. On his return to England he began to take an active part in politics, identifying himself with the extreme Whig party throughout the whole of the three or four eventful years which followed the Glorious Revolution, and was a leading member of the Whig Opposition of the old school. He was suspected by both parties, in which restless agitator had pinched himself. At the accession of James II. Mordaunt became a prominent parliamentary opponent of the first minister, and one of the chief agitators of the court of the early reign of King William. Indeed he went at once so fast and so far as to press upon William of Orange a premature scheme for the invasion of England, which princely with his usual cool judgment rejected. After the Revolution he entered the House of Lords. He was an extreme and active Whig, but it was probably as much his zealous anxiety to supplant William's ministers suspected ofJacobitism as to combat Jacobite designs themselves that led to his embroilment in those intrigues arising out of the Assassination Plot, and the Fenwick trial, which ultimately resulted (January 1697) in his committal to the Tower. He was liberated in less than three months, and for several years thereafter he seems to have played no prominent part in public affairs.

In the war of the Spanish succession broke out, and in 1705 Peterborough (for by his uncle's death he had succeeded to that title shortly after his release from imprisonment) was appointed to the command of an army of 4000 Dutch and English soldiers, which he proceeded to Ypres, and there to begin the extraordinary campaign which has made his name famous in history. After successfully resisting the solicitations to attack the city which were addressed to him by the Prince of Hesse-Darmstadt, fresh from the capture of Gibralatar, he was joined by the English, and was sent to the Spanish throne, for whom the allies were fighting. Peterborough succeeded by a pretended retreat in surprising and capturing the strong fort of Monjuich on the south side of Barcelona, from which position of vantage he soon managed to reduce the city. The Catalan towns one after another declared for Charles; Gerona, Tarragona, Tossa, and Lerida opened their gates to him. In his conquest of Barcelona he marched southward in the depth of winter and driving back his emperor, reached Valencia early in February 1706. Meanwhile an army under the Duke of Anjou, the Femen claimant to the throne (afterwards Philip IV.), and Marshal Tessé had entered Catalonia, and was closely pressed by the Barcelonians. About the same time blockaded by a fleet under the Count of Toulouse. Hurrying back to the scene of his former exploit, and seeing that it was from the side of the sea that the town must be relieved, Peterborough threw himself on board one of the ships of the English squadron, took command in virtue of his commission, which gave him supreme control over the British forces at sea as well as on land, sent his orders to the admiral, and drove Toulouse and his fleet from before the port. This success was followed by the raising of the siege, the capture of Barcelona, and the splendid successes of Peterborough on the east coast, Galway, the British commander on the Portuguese frontier, advanced into the heart of Spain, and in June entered Madrid. Peterborough's eyes were set on marching from Valencia, whither he had now returned, and to effect a junction with Galway, but the archduke dallied irresolutely at Barcelona. Precious time was lost, Berwick rallied his forces, and compelled Galway to evacuate the capital, and when at last Charles advanced and summoned Peterborough to join him, it was too late. A plan formed by him for the recovery of Madrid was rejected, and in disgust he obtained permission to depart for Genoa to raise a loan on the Spanish revenues. Returning with success from his mission, he acted for some time as a sort of adviser to his military successors in Spain, but his imperious temper seems to have unfulfilled him for anything but supreme command, and his differences with Lord Stanhope and others led to his recall in March 1707.

His career thenceforward till his death at Lisbon on 25th October 1735 is interesting only to the student of letters and not to the politician. He was, as is well known, an intimate friend of Pope, with whom he was in constant communication almost up to the last day of his life, and whose genuine esteem for him may be inferred from the somewhat theatrical exterior which he presented to the world there lay qualities which justly endeared him to his friends. In 1722 he was, it is said, privately married to the famous singer Annaesia Robinson, but the lady was not publicly acknowledge as his countess till shortly before his death. Recent military criticism has made an elaborate endeavour to show that Peterborough's fame as a conqueror rests wholly on a basis of imposture, and that the whole credit of his conquest of Valencia must be distributed among others. This extreme view, however, has been shown by Mr Stebbing in his judicious and impartial monograph to be untenable. His verdict is that the figure of the hero remains much where it was, though its pedestal may have been somewhat lower.

See the Memoir by Russell (2 vols. 1887), and Stebbing's Peterborough (English Men of Action series, 1890).

PETERHEAD, a seaport and burgh of barony of Buchan, Aberdeenshire, on a peninsula, 32 miles by road, but 44 by a branch-line (1862), N.E. of Aberdeen. The town, which burned in 1599, was afterwards rebuilt in a regular plan, but clean and largely built of the celebrated 'Peterhead granite,' whose reddish
variety is so much used for monumental purposes. The Keiths, Earls Marischal, were superiors of the place till the rebellion of 1715, when the Old Pretender landed here, and after which their forfeited estates were purchased by the Edinburgh Merchants. Little is known of Argyle, and the improvements are owing. Of Marshal Keith (q.v.) a bronze statue was presented to the town in 1899 by King William of Prussia; and the market-cross, a granite Tuscan pillar (1833), bears the arms of the Earls Marischal. The public buildings (1836 to 1881), the town hall (1858), with a spire 125 feet high; the parish church (1803), with one of 118 feet; the free library and museum (1891); the academy (1846); and convict-prison (1859). Industries are woollen manufacture, boat-building, and granite-polishing. Peterhead was made a head-port in 1553. From 1788 it gradually became the chief British seat of the seal and whale fisheries, until in 1832 it sent out 30 ships; but since then there has been a great decline. At present Peterhead is chiefly important for its great herring fishery, which employs hundreds of boats, and which during the herring season brings some 5000 persons to the place. The south harbour was commenced in 1773, and the north harbour in 1818, a canal being formed between them in 1850; whilst a new harbour was formed north harbour commenced under the Acts of 1873 and 1876. Their three basins, hewn out of the solid rock, together cover about 22 acres, and have cost £300,000; but all three are as nothing compared with the great harbour of refuge, the works for which, designed by Sir John Coode, were commenced in 1866, and are to be completed in 1921 at a cost of £746,000. In the neighbourhood are the ruins of Inverugar, Ravenscraig, and Bodin castles, all strongholds of different branches of the Keiths; Buchan Ness, the most easterly point of Scotland, with a lighthouse (1827); and the Mullers of Lindhead (q.v.). Since 1838 Peterhead has united with Elgin, &c. to return one member to parliament. Pop. (1801) 3264; (1831) 7293; (1871) 19,922; (1891) 12,226.

See Peter Buchan's Annals of Peterhead (1819), besides his 7 vols. (1793) and Arisbuth (1815).

Peterhof, a palace of the Emperor of Russia, on the southern shore of the Gulf of Finland, 18 miles W. of St Petersburg, was built by Peter the Great in 1711, contains a fine collection of paintings, and is surrounded by beautiful parks and gardens. It is the model of those at Versailles, with cascades, terraces, and summer-houses. The town of Peterhof has 14,296 inhabitants.

Peter Lombard. See Lombard.

Peterloo Massacre, the name popularly given to the dispersal of a large meeting by armed force in St Peter's Field, Manchester, Monday, August 16, 1819. The assemblage, consisting chiefly of labourers of operatives from different parts of Manchester, called to discuss the question of parliamentary reform, and the church, on open hustings, was occupied by 'Orator' Hunt (q.v.). The dispersal took place by order of the magistrates; several troops of horse, including the Manchester Yeomanry, being concerned in the affair. Eleven persons (men, women, and children) were killed, and some 600 wounded. St Peter's Field is now the site of the Free-trade Hall. 'Peterloo' was a name suggested by Waterloo.

Peter Martyr, the patron saint of the Inquisition, a Dominican of Verona, who, for the severities exercised in the exercise of inquisitorial functions, was in 1292 slain at Conegliano, in the interests of an inquired populace. His death formed the subject of a masterpiece by Titian, destroyed by fire at Venice in 1687.

Peter Martyr (Ital. Pietro Martire Vermigli), Reformer, was born in Florence, September 8, 1500, entered at sixteen the order of the canons regular of St Augustine at Fiesole, studied at Padua, and became abbot of Spoletto, and later prior of San Fosfero, but soon fell under the suspicions of the Inquisition, and had to flee to Zurich (1542). At Strasbourg he was welcomed by Imer, and made professor of the Old Testament. In 1547 he came to England on Cranmer's invitation, lectured at Oxford on 1 Corinthians and Romans, and took an active part in the great controversy of the day. Mary's accession drove him back to Strasbourg, now grown too Lutheran for his tastes, and at length in 1555 he repaired to Zurich, where he died, November 12, 1562. His admirable Locci Communes was printed at London in 1575. See the study by C. Schmid-Francken, Zurich, 1881.

Peter Martyr Anglerus, historian, was born in 1450 at Arezzo, on the Lago Maggiore, of an ancient family belonging to Anghera, obtained a footing at the court of Ferdinand and Isabella in 1487, and rose to high ecclesiastical preferment in Spain. He was ultimately named Bishop of Jaén, and died at Granada in 1525. He wrote De Orbe Novo (1516), giving the first account of the discovery of America; De Legatione Bavonicensis (1516); and Opus Epistolarum (1530). See Berreys, Petrus Martyr Anglerus et sein Opus Epistolarum (1896).

Petersburg, the third city of Virginia, on the south bank of the Appomattox River, 23 miles by rail S. of Richmond. The falls above supply water-power for foundries, cotton, flour, and paper mills, and especially tobacco-factories. Petersburg is a well-built place, and contains a fine park. In the campaign of 1864 Grant, failing to take Richmond, was repulsed in several attacks by General Beauregard, with heavy loss. Pop. (1900) 21,810.

Petersburg. See St Petersburgh.

Petersfield, a market-town of Hampshire, 20 miles NNE. of Portsmouth by rail. Till 1832 it returned two members, and then till 1885 one. Pop. (1861) 8781.

Peter's-peece (denuros S. Petri), the name given to a tribute offered to the Roman pontiff in reverence of the memory of St Peter. From an early period the Roman see had been richly endowed; but the first idea of an annual tribute came from Anglo-Saxon England. It is ascribed by some to ius (721 A.D.), king of Wessex, by others to Ofla of Mercia, and by Lindard to Alfred the Great. It was extended to Ireland by Henry II. The tax consisted in the payment of a silver penny by every family possessing land or cattle of the yearly value of 30 pence, and it was collected during the five weeks between St Peter's and St Paul's Day and August 1. The tax, also called Rome-see, varied greatly in amount, but continued to be paid with intervals till the reign of Henry VIII. By Gregory VII. it was sought to establish it for Rome, and traces of a similar payment appear also in Denmark, Sweden, Norway, and Poland. This tribute differed from the payments of the feudal kingdoms, such as Naples, Aragon, and England under the reign of John. The tribute practically ceased at the Reformation. The pope having suffered a considerable loss of revenue since the revolution of 1848, an effort was made in several parts of Europe to revive the
payment of Peter's pence, not as a tribute but by the collection of free-will offerings. In some countries, as in Portugal, it was universal, and since the total annexion of the Papal States to the kingdom of Italy the tribute has been largely increased in France, Belgium, England, and Ireland. In 1877, on occasion of the jubilee of Pius IX., the payment amounted to £900,000.

**Peter the Hermit**, the apostle of the first crusade, was born and a native of Amiens, where he was born about the middle of the 11th century. He served some time as a soldier, became a monk, and is usually said to have made a pilgrimage to the Holy Land before 1094, when he began the preaching of the crusade. He failed in his first attempt, and leave such a mark on history. But it should be noted that Hagemeyer in his monograph *Peter der Erzmütig* (1880) denies that Peter was ever in Palestine till he went with the crusaders, and asserts that the scheme of a crusade originated with the pope, not with the hermit. The article CRUSADES gives an account of his preaching, its results, and of poor Peter's faint-hearted attempt at desertion during the siege of Antioch. After the end of the crusade he returned to Europe, and founded a monastery at Huy in the Loire department. He died 115. His remains were translated to Rome in 1634.

**Peter the Wild Boy** was found in July 1724 in a wood near Hanhœ in Hanover; ‘he was walking on his hands and feet, climbing up trees like a squirrel, and feeding upon grass and moss of trees.’ He was taken to George L., brought over by him to England in 1726, and placed under the care of the celebrated Dr Arbuthnot, who had him baptised ‘Peter.’ He was fond of music, but could never be taught to articulate more than ‘Ki Sho,’ ‘Qui Ca,’ and ‘Hom Hen,’ for ‘King George,’ ‘Queen Caroline,’ and ‘Tom Tom,’ the last of the Hertfordshire farmers with whom he lived after 1737. He would sometimes ramble away, on one occasion as far as Norwich, so was provided with a brass collar inscribed ‘Peter the Wild Boy, Broadway Farm, Berkshire.’

Lord Monbodho visited him in 1782, and in his *Origin of Language* describes him as only 5 feet 3 inches high, now about seventy years of age, quite tame, bearded, and fresh and healthy. But on the farmer’s death Peter took to his bed, refused food, and in a few days died, in August 1785. See *Notes and Queries* for 1857, and worked for a while.

**Peterwardein**, one of the strongest fortresses in the Austrian dominions, is situated in a marshy, unhealthy locality on the right bank of the Danube, 44 miles by rail N.W. of Belgrade, and is connected with Neusatz opposite by a bridge of boats. Pop. of town, 3605. The most ancient part of the defences, the so-called ‘Strange Tower’, is built on a rock of serpentine, which on three sides rises abruptly from the plain. The fortress was held by the Turks from 1526 to 1687. In 1688 the fortifications were blown up by the imperialists, and the town with some 10,000 people abandoned to the sword of the Turks; but at the peace of Passarowitz (1718) it remained in the possession of the emperor. Here, on 10th August 1716, Prince Eugene obtained a great victory over the Grand Vizier Ali. The Hungarians were compelled to yield the fortress to the Turks in his inspection 1749.

**Petiole.** See LEAF.

**Pétion de Villeneuve, Jérôme**, a prominent figure in the French Revolution, was the son of a procureur at Chartres, and was born there in 1753. He was practising as an advocate in his native city when he was elected in 1789 its deputy to the *Tiers État*. An ardent republican and fluent speaker, he quickly became popular, although essentially windy, verbose, and of mediocre understanding. He was a prominent member of the Jacobin Club, and as ‘Pétion the Tyrant’ was the ally of Robespierre the Incorruptible. He was sent along with Baronne and Latour-Maubourg to bring back the fugitive royal family from Varennes, and in the execution of this commission he acted in a brutal and unfeeling manner. He afterwards advocated the decapitation of the king, the establishment of a popularly elected regimen, and along with Robespierre received, 30th September 1791, the honours of a civic crown. On the 14th of November he was elected mayor of Paris in Baily’s stead, the court favouring his election to prevent that of Lafayette. On 10th October the mob seized the mob and the atrocious September massacres both fell within his year of office. He became the first president of the Convention, and was made ridiculous as ‘roi Pétion’ through Mannel’s proposal to give the president the same authority as the president of the United States. On the triumph of the Terrorists Pétion’s popularity declined, and he cast in his lot more and more with the Girondists, having become a habite Madame Roland’s salon. Like them he voted at the king’s trial for death, but with delay of his own motion and against the Convention. He was elected to the first committee of general defence in March 1793, and on 12th April he headed the fatal because unsuccessful attack on Robespierre. Proserbed among the twenty-two, on the 2d of June, he escaped to Caen, and on the failure of the attempt to make arraignments against the Convention fled to the Gironda with Guadet, Bazot, Barbaroux, Salle, and Louvet, and hid in a grotto at St Emilion. At length they were tracked and obliged to fly. The bodies of Pétion and Bazot were found in a cornfield, partly devoured by wolves. They were supposed to have died by their own hands.


**Petition**, a supplication preferred to one capable of granting it. The right of the British subject to petition the sovereign or either House of Parliament for the redress of grievances is a fundamental principle of the British constitution, and has been derived from very early times. The earliest petitions were generally for the redress of private wrongs, and the mode of trying them was judicial rather than legislative. The earlier petitions were generally addressed to the House of Commons first became frequent in the reign of Henry IV. Since the Revolution of 1688 the practice has been gradually introduced of petitioning parliament, not so much for the redress of specific grievances, as regarding general questions of public policy. Petitions must be in proper form and respectful in language; and there are cases where petitions to the House of Commons will only be received if recommended by the crown, as where an advance of public money, the relinquishment of debts due to the crown, or compensation for losses out of the public funds is prayed for. A petition must, in ordinary cases, be presented by a member of the House to which it is addressed. The system is, however, not without its disadvantages, as when the attempt is made to over ride the courts of law popular petitioning is a vast system being presented on behalf of murderers convicted after fair trial. For election petitions, see *Parliament*, Vol. VII. p. 775. The monster Chartist petition of 1848 claimed to bear six million signatures. In the 200 years ended 1848, petitions presented to the House of Commons were 70,072; in the five years ending 1872, 101,573;
PETITION OF RIGHT

PETRARCH

in the years 1873-81, 123,870. In one year (1875) there were as many as 20,610, signed by 3,088,970 persons. On the other hand, the year 1889 produced only 8317 petitions.

In the United States the right of the people to petition government is expressly secured by the First Amendment of the Constitution, and is thoroughly interwoven with the ideas and usages of the nation—although, indeed, conflicts with slavery, it was resolved that petitions relating to slavery or the abolition thereof should be laid on the table without being printed or read, and finally that such petitions should not be received at all.

Petition of Right, a declaration of certain rights and privileges of the subject obtained from King Charles I. in his third parliament—the first statutory restriction of the powers of the crown since the accession of the Tudor dynasty. It was so called because the Commons stated their grievances in the form of a petition, referring to accord the supplies till its prayer was granted. The petition professes to be mere expression and explanation of the ancient constitution of the kingdom; and after reciting various statutes that recognise the rights contended for, prays that no man be compelled to make or yield any gift, loan, benevolence, tax, or such like charge, without common consent by act of parliament; that he be called upon to make answer for refusal so to do; that freemen be imprisoned or detained only by the law of the land, or by due process of law, and not by the king's special command, without any charge; that persons be not compelled to receive soldiers and mariners into their houses against the laws and customs of the realm; that commissions for proceeding by martial law be revoked. The king at first eluded the petition, expressing in general terms his wish that right should be done according to the laws, and that his subjects should have no reason to complain of wrongs or oppressions; but at length, on both Houses of Parliament insisting on a fuller answer, he gave an unqualified assent on the 26th of June 1628. The text of the Petition will be found most conveniently in Gardiner's Constitutions Documents of the Puritan Revolution, 1623-80 (1889). See also his History of England, vi. 274-306.

Petitio Principii ("a begging of the principle or question") is the name given in Logic to that species of vicious reasoning in which the proposition to be proved is itself assumed in the premises of the syllogism.

Pétöfi, Sándor, Hungarian poet, was born on 1st January 1823 the son of a butcher, at Kis-Körös, in the county of Pest, and after school-days was successively actor, soldier, and literary hack. His first poem, published in 1842, was followed by a volume in 1843 which secured his fame as a poet. He diligently studied German, French, and English, translated Shakespeare's Coriolanus, but in 1848 threw himself heartily into the revolutionary cause, writing numerous popular war-songs. He fell in the battle at Scherbob (Segesvár), 31st July 1849; but it was long believed by the Hungarians that he had escaped, and would reappear. His lyrical poetry breaks completely with the old pedantic style till then in vogue, and, warm with human and national feeling, began a new epoch in Hungarian literature. The first collected edition of his poems appeared in 1874; since then they have been translated into English by Bowring and others. There are lives by Oját (1868) and Fischer (1888).

Petra (the Greek equivalent of the Heb. Sela, both names signifying 'Rock'), anciently the stronghold and treasure-city of the Nababatrakians (q.v.), was situated in the 'desert of Edom' in northern Arabia, near the points of intersection of great caravan-routes from Palmyra, Gaza, Egypt, and the Persian Gulf, four days' journey from the Mediterranean and five from the Red Sea. It was approached by a chasm or ravine, which in some places is only 12 feet wide, while the rocky walls of red sandstone tower more than 100 feet above. Along this ravine are the most famous ruin of Petra, the Khnsa or 'treasury of Pharaoh,' and a theatre, both shaped out of the solid walls. All along the face of the rocks that overlook the valley are rows of cave-dwellings hewn out of the solid stone, and ornamented with façades. The floor of the valley, about two miles across, is strown with ruins. The earliest name was probably Beken; hence Petra has been identified with Kadesh Barnea, and as the place where Moses struck the rock so that water flowed out. The little stream that descends the ravine, flowing eastwards, lends its origin in a spring called at the present day the Fountain of Moses. Petra was captured by the Romans in A.D. 106, and thereafter decayed, its place as a commercial centre being taken by Palmyra (q.v.). Nevertheless it continued to exist as a town; most of the ruined edifices belong probably to the first century of its decay. It is from Petra and not from the Greek word petra, that Arabic Petra gets its name. See De Luynes, Voyage d' Exploration (1803-50); Palombi and Domant, Arabie Pétrée (1850-54); Palmer, Desert of the Edos (1871); Stanley, Sinai and Palestine (1860); and other works cited at Edom.

Petrarch. Francesco Petrarca, one of the earliest and greatest of modern lyric poets, was the son of a Florentine notary, Pietro di Messer Parenzo, the name of Francesco Petrarca by which the poet is known being the Latinised form of Francesco di Petrarca, viz. Francis of Peter. Petrarca's father was exiled from Florence (1302) along with Dante during the struggles between the two factions of the Brunelleschi and Neri, when the latter party obtained the upper-hand. He took refuge with his family in Arezzo, where, on the 20th July 1304, Francesco was born.
The poet's infancy was passed in Tuscany until 1312, when his father determined to go to Avignon, which was then a papal court; but lately it was

ferred. There and in the neighbouring small town of Carpentras Petrarch's studies began, and were continued later at Montpellier and Bologna.

His father intended him to enter the legal profession; but instead of jurisprudence he devoted himself to that which his most intimate friends, his favourite authors, on whose style he afterwards strove to model his own, being Cicero and Virgil. It was only later in life that he tried to learn Greek, in which he never attained to any proficiency. After his father's death, whom his mother did not live to see again, Petrarch was left an orphan. As was the custom of the time, more especially at the papal court, he and that brother Gherardo, being without means, became ecclesiastics; but Francesco never took holy orders. His chief source of income became the small benefices ferred on him by his many powerful patrons; but in after-life he refused higher preferment, declining even the much coveted post of papal secretary, rather than compromise his independence. Petrarch is reported to have been a handsome young man of excellent family, and retained all the refinements of court-life. It was at this period of his life that he first saw Laura, the lady whose name he was to immortalise in his lyrics, and who inspired him with a passion which has become proverbial for its constancy and purity. The meeting took place in the April of 1327, and Petrarch's first sonnet to Laura was published in the Biblioteca of St. Clara at Avignon. This date, as well as that of Laura's death on the same day in the year 1348, stands recorded by Petrarch's own hand on the dy-leaf of his Virgil, now amongst the treasures of the Ambrosian Library at Milan. The identity of Laura is still the subject of much speculation; but one most generally accepted hypothesis is that of the Abbé de Sade, who identified the poet's love, on somewhat slender evidence, with a member of his own family, Laura de Noves, married in 1325 to a Hugo de Sade to become the mother of eleven children, and died in April 1348. It was also at this time that Petrarch's friendship began with the powerful Roman family of the Colonnas, and especially with Jacopo Colonna, Bishop of Lombez.

The dawn of the new birth of letters and art which was then beginning, was already altering the status of the poet and artist, and as the fame of Petrarch's learning and genius grew his position became one of unprecedented consideration. His presence at their courts was competed for by the most powerful sovereigns of the day, and such was the exceptional position he enjoyed that he has said of himself that princes had lived with him, not he with princes. His chief patrons were Pope Clement VI, the Emperor Charles IV, King Robert of Naples, the Viscount of Milan, Jacopo da Carrara, Lord of Padua, Azzo da Correggio, Lord of Parma; in Venice the senate bestowed a palace on him in return for his promise to leave that town his library; Florence offered him the restoration of the confiscated possessions of his family if he would reside there; and in Aragon a woman who was born was kept as a

durary. When wearied by court-life he sought retirement and quiet in his country-house at Vaucluse, near Avignon. He travelled repeatedly in France, Germany, and Flanders, wherever he went, searching diligently for manuscripts and enriching his collection. He made some valuable bibliographical discoveries, finding in Liége two new orations of Cicero, in Verona a collection of letters of the same writer, and in Florence a then unknown Institution of Quintilian's. In the cosmopolitan society of the papal court Petrarch became acquainted with learned men of all countries, whom he interested in his unwearied search for valuable manuscripts. The example given by Petrarch in his love of learning probably gave the first incentive to the collection of manuscripts which bore such rich fruits in the following century. But the most glorious moment of Petrarch's honoured career was when, invited by the senate of Rome on Easter Sunday, 1341, he ascended the steps of St. Peter's, to receive the crown, from his admiral, Robert of Anjou, King of Naples, and there, after delivering an oration on poetry and the significance of the laurel, he was crowned poet-laureate amid the acclamations of thousands. After this pagan ceremony he went to leave his crown on the tomb of St. Peter's. The news of the death of his beloved Laura and his friend Cardinal Colonna, he left Avignon for ever, disgusted with the corruption and vice of the papal court. The remaining years of his brilliant life were passed in various towns of Northern Italy, and in the retirement of a country-house at Arpach, near Padua, the only one of his many habitations still in existence. There, tenderly cared for by his natural daughter, Francesca, and her husband, and occupied to the last in his favourite studies, he quietly ended his life.

Petrarch may be considered as the earliest of the great humanists of the Renaissance and the founder of modern classic culture. His passionate admiration for antiquity and the classic authors was no longer that of Dante and the earlier writers, whose enthusiasm was incorporated with the feelings and needs of their own time and stamped with their own individuality. The more contemplative and less original mind of Petrarch lent itself rather to an entire withdrawal from and disdain for all that later times have produced, and his constant efforts to imitate are closely associated with the kind of thought and expression of the great Latin writers. He attained to a surprising purity of style in his Latin works, and the admiration which these writings excited in his contemporaries was boundless. Petrarch himself chiefly founded his claim to posthumous fame on his epic poem Africa, the hero of which is Scipio Africanus, and his historical work in prose, De Viris Illustribus, a series of biographies of classical celebrities. His other important Latin works are the elegies and epistles in verse; and in prose the dialogues, De Contemptu Mundi and Secrecum, and the treatises De Oti Religiosorum (written while visiting his brother, who had joined a Carthusian brotherhood) and De Vita Solitaria (written at Vaneluse); and particularly important for historical and biographical purposes is the numerous collection of letters divided into Familiaria, Variae, Ad Veteres Illustres, Seniles, and Sine Titulo.

Petrarch was an ardent patriot, but he had little practical influence on the political life of his time. His理想 were those of a poet, and not of a

stateman. However great his merits as patriot or student, his name would be little remembered now; it is by his lyrics alone that his fame has lasted for over five centuries. His title-deeds to fame are in his Causicentri, in the sonnets, madrigals, and songs written in Italian, almost all inspired by his unwieldy passion for Laura, and in which the character of the man and the reality of a strong sentiment find their expression. The history of Petrarch's love presents few incidents; its entire interest lies in the intense and unadorned passion which we see the picture of a human soul in all its contradictions, pains, and struggles. Such self-analysis was unknown in medieval writers, and Petrarch has therefore been called the first modern man. His later life was one of rest and tranquility, 'I Triomphi' ('Triumphs'), also in Italian, and is of unequal merit, the only remarkable
passages being those which refer to the beginning of the poet's love ('Triumph of Love') and to Laura's death ('Triumph of Death'). Few of Petrarch's lyrics treat of other subjects, but amongst these few are three of his finest efectone, which address to his country ('Italiam'), in which he reproaches the Italian princes for their dissensions, and for calling to their aid the mercenary 'barbarisms' who were the scourge of Italy, words repeated by Machiavelli in his Prince, a century and a half later, and in our own day in the struggle for freedom from Austria; the second (Spero Gentii), which some commentators consider to be addressed to the young Coloma, and others to the famous Cola di Rienzi, whose wild attempt to resuscitate the ancient forms of republican government in Rome had fired Petrarch with enthusiasm; and the third (O Aspettando Ciel Bento e Bella Animala), addressed to his friend Jacopo Colonna, to incite him to join the crusade of Philip of France against the infidels. Petrarch was in constant correspondence with his great contemporary, Giovanni Boccaccio (Lettere di Boccaccio, ed. by Corazzini, Florence, 1877), and translated into Latin his friend's tale of Patient Griselda (De Odiositatis ac Fide Uxorii). Chancer alludes to this when he says of his Clerk's Tale:

Lear'd at Padova of a worthy clerk,  
Francesco Petrarch, the fairest poet,  
Hight this clerk, whose rhetoric wrote  
Enamour'd at Illeito of poetry.

The earliest complete edition of Petrarch's works is Franzensi Petrarchae Opera Omnia (Basel, 1534, fol.), and have since gone through innumerable editions, with or without commentary. The most reliable is that of Mansand (Padua, 1819, 4to); his text is used by Leopardi, in the Italian edition of the poetry (Milan, 1839), often reprinted. The letters have been edited by Fracassetti, and partly translated into Italian, with a valuable commentary (Florence, 1839-63-69). See the Abbe de Sade, Memoires de Petarque (1764); Mozziere, Petarque (1863); Koerting, Petrarques Leben und Werke (1878); the little monograph by Henry Reeve (1857); also Gaspary, Italianische Literatur (Berlin, 1885); Bartoli, Letteratura Italiana (Florence, 1854); De Santis, Storia sul Petrarco (Naples, 1869); Zambini, Studii sul Petrarca (Naples, 1878); Voigt, Wiederbelebung des geschlossenen Alterthums (Berlin; 2d ed. 1890); and Symonds, Renaissance in Italy (2d ed. 1886).

Petræ, an English Catholic family, descended from Sir William Petre, secretary of state in the reigns of Henry VIII, Edward, Mary, and Elizabeth. The most notable member was Edward Petre the Jesuit (1631-99), who shared the captivity of his kinsman Lord Petre in the Tower in connection with Oxen's 'Papist Plot,' but released by James II. sat in the Privy-council. He was abhorred as James's evil genius, and escaping at the Revolution became rector of St. Omer.

Petræi (Procollararia), a genus of sea-birds of the family Procellaridae, which includes the albatrosses, shearwaters, fulmars, and petrels proper, and is allied to the gulls and petrels. The true petrels, of which there are eighteen widely distributed species, are long-winged birds of powerful flight; the bill is broad and of medium length; the hind toe is very small; the claws are narrow and pointed; the incubant is long and slender, and the tube-like nostrils are set close beneath them. They are strictly oceanic, and visit coasts and islands only for breeding purposes. The best-known species is the Stormy Petrel (P. pelagica) or Mother Carey's Chick, which is scarcely larger than a lark, and is the smallest web-footed bird in the world. The head and back are sooty-black, the wings black, with streaks of white, the under surface greyish black, the bill black, and the feet reddish brown. The name Petre—a diminutive of Peter—refers to its apparent walking on the water, the lightness of its body enabling it to skim up and down the waves, even in a storm, with only enough motion of the wings to keep the feet from sinking under the surface. Because of its frequent occurrence before or during stormy weather, the molluscs and other animals upon which it feeds are driven to the surface, and possibly also because of its blackness, it is regarded by sailors as a bird of evil omen.
PETROGRAPHY

importantly, the pyramids and temples of Egypt (book, 1887), and equally well by its being rendered as a composite of the mound. Fund, to the mounds of said—the Scripture Zoro, the forgotten city of Nankratis, Anu, and Defenndl. His Memoirs on Tanis (1885–90), on Naukratis (1886), on Tel el Hesy, the site of Lachis (1891), on Medmen (1882), and on Ten Year's Diggings (1892), are generally regarded as an important contribution to the science of the ancient world.

Petritiation, a name given to organic remains found in the strata of the earth, because they are generally more or less mineralised or made into stone. The word has fallen very much into disuse, having given place to the terms Fossil (q.v.) and Organic Remains. The name petritiation is also loosely used of an object which, from being exposed to the action of limy or other water, becomes covered with a crystalline deposit. See (under Fossil) Fossil Forests.

Petro-Alexandrovsk, the seat of administration of the Amu-Daria district, is little more than a fort, and is situated on the Lower AmuDaria or Oxus (q.v.), 30 miles E. of Khiva.

Petrography is that branch of geological science which deals with the minerals and rocks of the earth, from the point of view of their origin, and hence by many geologists the term Petrology is preferred as a name for this branch of science. Others use Petrography in a similar sense. For a general account of rocks, their mineral composition, and their relations to geological processes, see the section Petrology under GEOLOGY.

Petrographers are hardly yet agreed on any particular classification of rocks, not certainly from the want of materials, for a very large number of so-called rock-species have been described, but in the case of the crystalline igneous rocks so many gradations exist between one kind and another that the definition of rock-species is often very difficult. As careful descriptions and comparisons are not yet universally submitted to a classification, it may be necessary to form several intermediate groups of the igneous rocks which flourish at present; species will come to be included as mere varieties of a few well-marked types.

In examining a rock the petrographer notes first the crystallography, which can be seen by the naked eye (nacreous or epitactic), such as its structure (whether crystalline, vitreous, compact, or chalybite, &c.); its state of aggregation or relative hardness; its colour; its composition; and specific gravity—which may vary from 0.6 among the hydro-carbon compounds to 5.1 among the basalts, the average specific gravity of rocks in general being about 2.5 or a little more. In the case of many coarse-grained rocks, especially those belonging to the derivative division, it is hardly requisite to go beyond a macroscopic examination. But when the rock consists of small grains, it is subject to closer scrutiny. Thin slices are therefore prepared for microscopic study, after which it is frequently found that the apparently smooth compact mass turns out to be composed wholly or largely either of crystalline or of fragmental materials. Even in the case of rocks which are manifestly crystalline, and the mineral ingredients of which can be determined macroscopically, it is necessary that a microscopic examination should be made. When this is done the rock will sometimes be shown to contain minute crystalline

granules and crystals, or small quantities of non-differentiated matter and glass which quite escape the unassisted eye. The minute structure of the various rocks, especially of the igneous rocks, is determined by means of the microscope, and the chemical changes which they may have undergone since the time of their formation are carefully studied. In this way much light has been thrown on the genesis of rocks and the changes which these have subsequently undergone.

Of the minerals known to science comparatively few are rock-formers; the larger number of these are practically confined to the igneous and sedimentary rocks, very few entering into the formation of the more important rocks of the Earth. The chemical constituents of the igneous rocks are grouped as essential, accessory, or adventitious, and secondary. The essential minerals are the most important, as it is upon their presence that the various species of rocks depend. Accessory minerals are accidental ingredients, the presence of which does not affect the specific character of a rock; if sufficiently prominent or remarkable they merely give rise to varieties. Secondary minerals are the products of chemical changes subsequent to the formation of the rock in which they occur—the secondary mineral species are accumulated upon the primary mineral species of the rock. Some of the secondary essential minerals of igneous rocks are quartz, felspar, nepheline, leucite, pyroxene, hornblende, mica, and olivine. All these also occur as accessory ingredients, and there are many other accessory and mineral species which may be named—magnetite, ilmenite (see IRON), apatite, schoorl, titanite (sphele), haliyne (nosean), zircon, &c. Amongst the secondary minerals and decompositions in igneous rocks are quartz, chlorite, hornblende, biotite (see IRON), zoisite, epidote, chlorite, serpentine, green-tourmaline, &c. The chief mineral constituents of the Schisto rocks are the following: Quartz, mica, felspar, talc, chlorite, hornblende, actinolite (see AMPHIBOLE), omphacite, seragolite. Less prominent ingredients are muscovite and chloritised, which are called othrite, kyante, magnetite, schoorl, scholle, epidote, pyrite, specular iron, &c. The derivative rocks having been formed out of the debris of pre-existing rock-masses, whether igneous, schistose, or sedimentary, it is obvious that they may contain many of the minerals already described. There are many cases where they are composed of gneiss, the ore of granite or gneiss. But most of the minerals which aqueous rocks have derived from crystalline igneous and schistose rocks are more or less altered—to the felspars are kaolinised, the micas are reduced to non-calcic scales or folia of a dull grey colour and much diminished lustre, the pyroxenes, amphiboles, olivine, &c. are either unrecognisable or represented by decomposition products. Quartz, as might have been anticipated, owing to its resistance to the chemical action of water and its superior hardness, is the common mineral constituent of derivative rocks. The clay-rocks consist in large measure of the insoluble residue of the various silicates of alumina and the alkalies and alkaline earths, of which the alums and silicates are generally largely composed. The readily soluble and readily precipitated minerals calcite, dolomite, rock-salt, and gypsum are also important rock-formers in certain groups of derivative rocks. As binding materials (i.e. the mineral cements which hold the grains of many sedimentary rocks together) we have quartz, chalcedony, opal, &c., calcite, haematite, and limonite (see IRON), dolomite, siderite, &c. The rocks which are mainly composed of organic debris necessarily consist chiefly of calcareous and carbonaceous materials.
For purposes of description rocks may be grouped in the three following divisions: (1.) Igneous Rocks; (2.) Derivative Rocks; and (3.) Schistose Rocks.

1. Igneous Rocks (q.v.).—Of these there are two series—(a) crystalline and (b) fragmental or clastic. The crystalline series includes semi-crystalline and vitreous rocks, which are some of the more important varieties of which may be noted. These vitreous rocks usually contain crystals and microlites, and they often show perlitic and spherulitic structures. Some varieties are highly porous and frothy (spongolites, pumicite). Others are comparatively homogeneous, closely compact, and smooth like bottle-glass; while yet others are markedly porphyritic, usually with crystals of sandstone (see Felspar). Such vitreous rocks are most usually acidic (i.e. highly siliceous), but basic glasses are also known. The semi-crystalline rocks are composed of crystalline minerals and glassy matter in varying proportions. The crystalline ingredients often show minute inclusions of other minerals (endomorphs) or of glass, &c., which have been caught up while the vitreous rock was still in a semi-fluid state. Frequently also the crystals contain minute cavities which may be empty or filled with some liquid or gas. The whole crystalline rocks contain of course no glass or non-differentiated matter. It is in this class of rocks—many of which are of pheno-lithic, the semi-crystalline rocks—of which most recent occurrence in the constituent minerals. In the minerals of semi-crystalline and crystalline rocks which have been erupted at or near the surface liquid cavities are less common. In vitreous, semi-crystalline, and crystalline rocks alike the mineral ingredients are not solidly disposed in lines or bands. This is called fusion or fluidal structure—the ingredients having arranged themselves in this manner while the igneous rock was still and in motion. Although not unknown in some holocrystalline rocks, it is a structure which is more characteristic of the vitreous and semi-crystalline rocks which have been poured out at the earth's surface as lavas. The appearance of the original mineral constituents of many igneous rocks shows that their crystallisation cannot have taken place contemporaneously in most cases, but rather that they belong to two stages in the consolidation of the rock which they form a part. Thus, in many crystalline and semi-crystalline rocks we readily distinguish a crystalline or semi-crystalline ground-mass, scattered through which occur larger crystals, many of which may be broken and corroded. These latter are believed to have crystallised while the molten rock was still at a considerable depth below the surface. Afterwards, when the fluid mass was poured out at or near the surface, and cooled rapidly, the smaller minerals and glassy matter of the ground-mass were formed. Although these two classes of minerals can be seen most clearly in rocks of a trachyctic and porphyritic aspect, yet even in granitoid rocks evidence of two stages or periods of consolidation can often be detected. The general character of fragmental igneous rocks is described in the article On the Petrolerous Limestone, Teff, and Igneous Rocks. Most of the rocks mentioned in the following tables have separate articles assigned to them.

(a) Petrology and Crystalline Series:

1. Orthoclase Rocks: obsidian, pumice, phonolite, trachyte, rhyolite, obsidiophrye, quartz, trachyte, phonolite, syenite, &c.
2. Plagioclase Rocks: andesite and porphyritic, diorite, basalt, gabbro.
4. Diabase Rocks or Pérorites: picrite, biotrite, diorite, &c.
5. Astmat Ixogous Rocks: various serpentines rocks.

(b) Fragmental or Clastic Series:

(b) Volcanic agglomerate, volcanic breccia, tuff: volcanic sand, ashes, dust, blocks, lapilli, and bombs.

11. Derivative Rocks.—As water has played a very prominent part in the formation of this great division of rocks, these are frequently termed aqueous or sedimentary. Such being the origin of by far the greater number of rocks in the sea, or beds, hence the name by which they are also widely known—stratified rocks. Some of the members of this division, however, are not of aqueous origin, while others do not occur in beds. But they are all alike in so far as the water has something to do with which they are derived by epigene agents from the degradation of pre-existing rocks, minerals, and organic bodies.

1. Gravel and Sand Rocks: rock-debris and breccia; rain-wash and brick-earth; soil and subsoil; sand and gravel, conglomerate; sand, sandstone, and grit; greywacke.
2. Clay Rocks: kaolin, piper-clay, illite, brick-clay, fuller's earth, bentonite or ill-tile, bentonite, argillaceous shale.
3. Calcareous Rocks: limestone and its many varieties (such as calcilean, chalk, oolite, marl, com-frock, &c.), dolomite, &c., in such manner as limestones.
4. Ironstone Rocks: limonite, hematite, spolite iron ore (spheroidal, blackband hematite), manganese iron ore.
5. Siliceous Rocks: siliceous coquina, chert, limestone, pyritic stone, jasper, &c., triplite and radiolarian oxe.

111. Schistose Rocks.—The more representative rocks of this division are more or less crystalline and schistose or foliated (see Foliation). Some, however, show faint traces either of crystalline or foliated structure; while others, although distinctly crystalline, are not schistose. Again, some of the rocks are fragmental, with more or less of superinduced crystalline structure. Many schistose rocks are clearly of metamorphic origin. They are altered igneous and derivative rocks. The origin of others is still obscure. See Archæological System, Geology.

Quartz-rock, quartz-schist baioliths, schistose conglomerate, clay-shirt and its varieties, phyllite, mica-schist, talc-schist, chlorite-schist, amphibolite-schist (actinolite-schist, hornblende-schist), gneiss, granite, schist, paragonite rock, marble.

See Rutley, The Study of Rocks (1879); Hatch, Petrology (1881); Cole, Aids in Practical Geology (1891); Einführung in die Mechanik der Erde (1879); Kalckowsky, Elemente der Lithologie (1861); Jannettaz, Les Roches (1884). More advanced works are Teall, British Petrography (1888); Fouqué and Lévy, Mineralogie de la France (1879); Rosenbach, Monographie physiographique des Minerals et leur texture (1885); Zirkel, Mineralogie der Braunkohlen der Mineralie. und Gesteine (1873).

Petroleum (from Lat. petra, a rock, and oleum, oil), rock-oil, an inflammable, dark liquid, essentially composed of carbon and hydrogen, which exudes from the earth in various parts of the world.

(1) General History.—It is impossible to state when petroleum was first discovered. In some form it seems to have been applied to the uses of mankind in the earliest periods known to history. The ruins of Nineveh and Babylon indicate that the asphaltic mortar used for their walls and buildings was made from a partially evaporated petroleum, obtained, doubtless, from the springs of Is, on the Euphrates. This is amply confirmed by the passages of Scripture (Gen. xi. 3). Horseldus (l. 119; iv. 195), 500 B.C., writes of the springs in the island of Zante, 'I have myself seen pitch drawn out of a lake and from water in Zacynthus.' &c. Strabo (xvi. 2) refers to the bitumen found in the valley of Judah, and sold to the Egyptians for embalming.
Diodore describes the same product obtained from a lake in Sicily and sold for the same uses. Pliny, in his histories, realizes the famous mention of the deposit in Albana on the Adriatic Sea. The holy fires of Bakou on the Caspian Sea, worshipped for ages by the people dwelling near, and the goal of pilgrimages even from India (see Vignes’ Travels in Caucasian and Little Tibet), have been supported by apparently super-abundant petroleum stores. The North American Indians collected what was known as Seneca Oil from petroleum springs, and the indications are that long before them the Mound Builders, who worked the copper-mines of Lake Superior, the lead-mines of Kentucky, and the mica-mines of North Carolina, not only gathered the oil coming from natural springs that appeared on streams, but even dug numerous wells in Pennsylvania, Ohio, and Canada, and dipped up the oil that flowed into them. Trees now growing in the earth thrown out in digging the wells, actually wells themselves, show that the work was done from 500 to 1000 years ago.

(2) Growth of the American Industry.—But the growth of the American industry, which has given the old world a new and fairer term to the people’s light, has been within the last 20 years of the century. From 1850 to 1858 many experiments were made with petroleum, both in the line of collecting the crude article and of refining it when secured, but with indifferent success. Among the promoters of the effort was the Pennsylvania Rock Oil Company, incorporated in 1854 under the laws of the state of New York. The superintendent of this company, E. L. Drake, in 1858 started to sink a well in one of the old pits supposed to be of prehistoric origin, near Titusville on Oil Creek, Venango county, Pennsylvania, and the Alleghany River. Adventurers and investors flocked thither from all parts of the country. What was known as the oil region was transformed from an almost unbroken forest into camps and towns in which fortunes were made in a day, and often as quickly squandered. Many wells yielded nothing, others lasted but a short time, while some gave enormous quantities of oil. But the producing fields were few, and are, still constantly changing; new ones being discovered, old ones failing. For example, Pittsboro City, near Titusville, Pennsylvania, in 1865 next to Philadelphia the largest post-office in Pennsylvania, has now entirely disappeared, and the site of the city, become a farm. Crude petroleum is at present secured in many parts of the state of Pennsylvania. Special mention might be made of M’Kean, Warren, Elk, Forest, Erie, Crawford, Venango, Clarion, Butler, Washington, and Greene counties. It is also produced in some parts of North Carolina, Ohio, Western Virginia, Colorado, Wyoming, Kentucky, California, and Texas, and in 1897 an important petroleum lake was reported to have been discovered in Alaska.

Between 1860 and 1867 the product of petroleum in the United States increased from 3, 343,000 barrels in production in 1867 being 69, 505,801 barrels, of a value of $40,929,011, while the export of mineral oils had a value of over $56,125,000. In the same year the United Kingdom imported 185,665,376 gallons, valued at £3,335,271. The use of petroleum for fuel, as in motor-cars (see GAS-ENGINE) has of late greatly extended.

The accompanying table gives the production of crude oil in the United States, the stocks, and the value of the wells for each year, 1861 to 1899 inclusive. The unit of measurement of crude oil is a barrel of 42 gallons.

<table>
<thead>
<tr>
<th>Year</th>
<th>Production</th>
<th>Shipments</th>
<th>Stock close of Year</th>
<th>Price at Wells</th>
</tr>
</thead>
<tbody>
<tr>
<td>1861</td>
<td>2,115,600</td>
<td>1,650,133</td>
<td>Unknown</td>
<td>$9.52</td>
</tr>
<tr>
<td>1862</td>
<td>2,050,066</td>
<td>3,101,571</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>1863</td>
<td>2,012,413</td>
<td>3,240,010</td>
<td></td>
<td>3.31</td>
</tr>
<tr>
<td>1864</td>
<td>1,116,152</td>
<td>1,842,061</td>
<td></td>
<td>7.85</td>
</tr>
<tr>
<td>1865</td>
<td>3,997,712</td>
<td>2,100,132</td>
<td></td>
<td>6.65</td>
</tr>
<tr>
<td>1866</td>
<td>3,507,909</td>
<td>1,096,001</td>
<td></td>
<td>7.59</td>
</tr>
<tr>
<td>1867</td>
<td>3,846,306</td>
<td>2,803,210</td>
<td>334,000</td>
<td>2.40</td>
</tr>
<tr>
<td>1868</td>
<td>3,714,441</td>
<td>2,462,510</td>
<td>264,000</td>
<td>3.57</td>
</tr>
<tr>
<td>1869</td>
<td>4,196,475</td>
<td>4,555,343</td>
<td>249,154</td>
<td>5.64</td>
</tr>
<tr>
<td>1870</td>
<td>5,056,046</td>
<td>5,598,165</td>
<td>557,501</td>
<td>3.56</td>
</tr>
<tr>
<td>1871</td>
<td>5,273,072</td>
<td>5,667,391</td>
<td>685,583</td>
<td>4.42</td>
</tr>
<tr>
<td>1872</td>
<td>6,555,774</td>
<td>5,899,942</td>
<td>1,174,000 Ext.</td>
<td>3.90</td>
</tr>
<tr>
<td>1873</td>
<td>5,949,566</td>
<td>9,699,775</td>
<td>1,255,127</td>
<td>1.73</td>
</tr>
<tr>
<td>1874</td>
<td>11,105,114</td>
<td>13,821,500</td>
<td>3,705,639</td>
<td>1.18</td>
</tr>
<tr>
<td>1875</td>
<td>8,048,740</td>
<td>8,924,888</td>
<td>2,735,758</td>
<td>1.24</td>
</tr>
<tr>
<td>1876</td>
<td>9,147,940</td>
<td>10,253,940</td>
<td>1,255,127</td>
<td>2.51</td>
</tr>
<tr>
<td>1877</td>
<td>13,902,756</td>
<td>15,469,644</td>
<td>2,857,008</td>
<td>1.87</td>
</tr>
<tr>
<td>1878</td>
<td>15,011,425</td>
<td>15,730,809</td>
<td>4,507,500</td>
<td>1.30</td>
</tr>
<tr>
<td>1879</td>
<td>30,985,000</td>
<td>16,256,280</td>
<td>6,004,946</td>
<td>1.98</td>
</tr>
<tr>
<td>1880</td>
<td>24,738,950</td>
<td>19,589,820</td>
<td>10,693,344</td>
<td>2.64</td>
</tr>
<tr>
<td>1881</td>
<td>29,074,456</td>
<td>21,940,021</td>
<td>23,553,411</td>
<td>3.55</td>
</tr>
<tr>
<td>1882</td>
<td>35,875,404</td>
<td>26,904,500</td>
<td>44,077,347</td>
<td>4.34</td>
</tr>
<tr>
<td>1883</td>
<td>34,350,360</td>
<td>21,967,697</td>
<td>35,715,595</td>
<td>2.95</td>
</tr>
<tr>
<td>1884</td>
<td>23,066,945</td>
<td>24,003,902</td>
<td>30,872,802</td>
<td>2.83</td>
</tr>
<tr>
<td>1885</td>
<td>21,999,804</td>
<td>27,091,500</td>
<td>43,031,838</td>
<td>3.28</td>
</tr>
<tr>
<td>1886</td>
<td>25,854,822</td>
<td>26,322,405</td>
<td>38,955,885</td>
<td>2.07</td>
</tr>
<tr>
<td>1887</td>
<td>21,817,007</td>
<td>26,067,191</td>
<td>26,310,282</td>
<td>2.60</td>
</tr>
<tr>
<td>1888</td>
<td>17,461,737</td>
<td>26,172,168</td>
<td>12,969,157</td>
<td>0.67</td>
</tr>
<tr>
<td>1889</td>
<td>22,715,362</td>
<td>30,696,850</td>
<td>10,023,412</td>
<td>0.94</td>
</tr>
<tr>
<td>1890</td>
<td>30,393,545</td>
<td>31,061,647</td>
<td>9,472,492</td>
<td>0.65</td>
</tr>
</tbody>
</table>

There are no reliable statistics showing the number of producing wells in existence. It is estimated by those best informed on the subject that in what is known as the Pennsylvania fields there were in 1891 between 30,000 and 40,000. At first the wells were all flowing wells, extending down to what was termed the first sand. Afterwards wells were sunk to the second and third sands. The average depth is from 1800 to 1800 feet, the shallowest wells being about 500 feet, the deepest about 3600 feet. Many wells, particularly when first completed, are flowing wells; that is, the oil is forced up through the tube composing the well, and reaches the surface of the ground without pumping. This of course indicates that the oil in the reservoir below the surface of the ground is held under pressure; but as an outlet is given for the oil the pressure subsides, and then becomes necessary to lift the oil by pumps. There are to-day a few flowing wells in America, but practically all the wells are pumped. Crude petroleum as it comes from the ground varies in general appearance from a bright lemon colour to a greenish black, all the interchanging shades being found, and in gravity (weight or density) from 38 of Baumé’s scale to 50, all the intermediate gravities being secured. The same well will, at different stages of its life, give oil of different colours and gravities, the colour growing darker and the gravity heavier as the well grows older. In 1802 it was found that in many cases dry wells could be made to resume their yield, and declining wells to continue production by being shocked with torpedoes. In 1897-98 a commission took evidence in England as to whether petroleum with a flash-point less than 72° (Abita close test) is dangerous, and reported by a majority that a flash-point at 100° should be taken as the standard of safety. And see EXPLOSIVES.

One of the most interesting features of the growth of the petroleum industry is found in the devices for transportation. The oil was at first carted in barrels over rough roads to the point of consumption or of loading into railroad cars. The wooden barrel gave place to light iron tanks on wheels, and the ordinary freight car for oil in barrels to wooden tank-cars, and these in turn to
iron tank-cars, some of which are of 3000 gallons capacity. But the greatest advance was made when pipe lines for the transportation of petroleum were introduced. Samuel Van Syckle, of Titusville, Pennsylvania, put down the first successful line, extending from Titusville to Claysville, a distance of about 35 miles. The oil region is now a network of pipes. They carry oil from the wells to central points for storage or for delivery to the trunk lines to be pumped to the refineries. Powerful pumps move the oil rapidly in vast quantities for great distances. This is done to fifteen or twenty thousand lines of 6- and 8-inch pipe, carrying the oil from the point of production to the refineries handling it. The most important lines are known as the National Transit Line, South-west Lines, Maucksburg Line, Tilewater Line, Western and Atlantic Line. By these crude oil is delivered at New York, Philadelphia, Baltimore, Cleveland, Buffalo, and Chicago. The total length of these main lines and their several branches and feeders is fully 25,000 miles. The American trade in petroleum is largely controlled by the Standard Oil Company.

(4) Petroleum in Other Countries than the United States. There are oil fields in many countries other than those in the United States. Producing petroleum in commercial quantities—those of Baku, Burma, Canada, Galicia, Peru, Japan, and, last to be developed, of Langkat, or Lankih, in Sumatra.

The Baku (q.v.) field yields immense quantities of crude of low gravity, which on being distilled gives only a small percentage (25 to 32) of burning oil of satisfactory quality. However, as the crude is very cheap, and the balance of the product from distillation can be sold for fuel, the refiners of the Russian crude have been able to compete with other refiners for a share of the world trade in petroleum. The petroleum of Canada, like that of several fields in the United States, particularly in the state of Ohio, is of low gravity, 26 to 42 Baumé, and has a peculiar smell and nauseous smell, on account of the sulphur it contains. It has been difficult to secure a market, but production has been fostered, and it supplies a large demand throughout the British provinces. The Japanese field has been known for many centuries, but the cheapness of the American refined products renders it unprofitable for products from the Japanese to compete. Production has been completely checked.

(5) Origin of Petroleum.—This topic is treated here somewhat out of its natural order, not because it is lacking in interest, but because so little seems to be known about the chemical geology of petroleum. There have been three leading theories advanced, under some one of which all of the results from different lines of investigation can be classified: (1) Petroleum is a distillate produced by natural causes; (2) petroleum is indigenous to the rocks in which it is found; (3) petroleum is a product of bacterial action. A full summary of the results of the investigations under each one of these theories is given by Professor S. F. Peckham in his report as special agent of the United States census for 1880. He inclines to the belief that Pennsylvania petroleum is of vegetable origin and the result of bacterial action.

See also Silliman, jun., Report on Rock-oil or Petroleum (1835); J. S. Newberry, Rock-oils of Ohio (1839); T. S. Hunt, History of Petroleum or Rock-oil (1861; Report Smithsonian Institution); A. Norman Tate, Petroleum and its Produce (1863), and Examination of Petroleum, &c. (1869); Draper and Pease, History of Petroleum,
PETROUSE

**PETROUSE**, a name given to the women of the French Company of 1871, who helped to burn the Tulleries, Hôtel de-Ville, and other public buildings by pouring petroleum on them.

**Petronez'on.** See LAMPREY.

**Petronei,** an ancient and clumsy description of pistol.

**Petrourius,** surnamed 'ARRIRER,' from his supposed identity with the Cains Petronius whom Tacitus calls 'wiser elegantissimum' at the court of Nero, is generally believed to be the author of the satirical romance or collection of satires of which the 15th and 16th books have, though in a fragmentary state, come down to us. The work seems to have been a novelty in Latin literature, consisting of a series of mock depictions of the licentious life in Southern Italy of the upper classes. Its artistic merit is great, in strength of portrayal and colour anticipating Zola, with a vein of humour as original as it is refined. Bücheler, its latest and best editor (Berlin, 1882), and Cesareo, its ablest critic (Florence, 1887), both support the long-prevailing view that its author was no other than the Petronius above referred to—a pro-consul of Bithynia and afterwards consul, a lusty master in all the arts of the voluptuary, the aider and abettor of Nero and the jeunesse dorée of the 1st century in every form of sensual indulgence. The favour he enjoyed at court aroused the jealousy of another contaminant of the emperor's, Tigellinus, who, though good enough to guide his disgrace and punishment. He had proceeded to carry on the work of research in Caphania, precipitated his determination to destroy himself. True to the cynical side of his philosophy he set about his suicide in the most leisurely fashion, so as to glide out of existence 'without undue haste,' and opened his veins at intervals and then rebandaged them. Attended by a swarm of topics, and listening to songs and vers de société when not transacting business or taking a siesta. Shortly before expiring he drew up, signed, sealed, and sent to Nero a summary of the tyrant's amours and excesses, none of which is supposed to have been embodied in his satires. The work, fragmentary as it is, has drawn around it quite a library of criticism and controversy, of which Cesareo gives an excellent résumé, whilst promising a yet fuller treatment on the subject. In style it represents the high-water mark of silver-age Lutinity, while, as a picture of the 1st century on its seamiest side it shows better than any other how Christianity had become a necessity, if only to save the morality of the world.

**Petropavlovsk.** a town of Asiatic Russia, in the province of Awkistol, on the river Ishin, 175 miles WNW. of Omsk. Pop. 11,406. It is an important military station, with a fort founded in 1792, and has a large transit trade. Petropavlovsk is also the name of a small port on the east coast of Kamchadka (q.v.) with an admirale harbour.

**Petropavlovsk.** a town of Russia, 65 miles NW. of Saratov, on a tributary of the Don. Pop. 15,316.

**Petrozavodsk.** a town of Russia, on the western shore of Lake Onega, 300 miles NE. of St. Petersburg. It is a cannon-founding and small-arms factory, built in 1774 on the site of an iron works started by Peter the Great in 1763. Pop. 11,027.

**Petrus Alphonius.** See FABLE.

**Pettenkofer, MAX VON,** chemist, was born near Neuburg on the Danube, 3rd December 1818, studied at Munich, Würzburg, and Giessen, and in 1847 becomes professor of Chemistry at Munich. He has made valuable contributions to science on subjects as various as gold-refining, gas-making, ventilation, clothing, the influence of soils on health, epidemics, and hygiene generally. His *Handbuch der Hygiene* (1832 et seq.) is his best known work. He resigned in 1894.

**Pettic, JOHN,** painter, was born at Edinburgh, 17th March 1809, was brought up at East Linton, studied art at Edinburgh, and died at Hastings, 21st February 1893. 'The Prison Pet' was exhibited at Edinburgh in 1839, and 'The Armourers,' at the Royal Academy in 1860. But the first work which showed his characteristic qualities of strong imaginative grasp of his subject, and movement, and vigorous treatment was the 'Drunken Court-martial' (1864). Among the hundreds of later pictures, including portraits, may here only be named 'An Arrest for Witchcraft' (1866), 'Scene in the Temple Gardens' (1857), 'Juliet and Friar Laurence' (1874), 'The Death of a Warrant' (1879), 'The Vigil' (1884), and 'The Chieflain's Candlesticks' (1886). Pettie was elected A.R.A. in 1866, and R.A. in 1873.

**Petty,** SIR WILLIAM, a man of singular versatility, best known as a political economist, was born at Romsey in Hampshire on 26th May 1622, and educated partly at Caen, partly at the universities of the Netherlands, and at Paris. His versatility and talent are evidenced by the positions he successively held, and the subjects he interested himself in: he taught anatomy and chemistry at Oxford (1648), and was made professor of Anatomy there (1651); was professor of Music at Gresham College, London; was physician to the army in Ireland (1652), executed a fresh survey of the Irish lands forfeited in 1641, started ironworks, lead-burners, sea-fisheries, and other industries on estates he bought, in procuring the west Irish timber for Henry Cromwell when he was lord-lieutenant of that island; was made surveyor-general of Ireland by Charles II., who knighted him; invented a copying-machine (1647) and a double-bottomed sea-boat (1663); and in early life took much interest in education. In political economy he claims a place as one of the most important precursors of Adam Smith, on the strength of his Treatise on Taxes and Contributions (1662) and his Political Arithmetic (1661), the latter a discussion of the value of comparative statistics. He died in London on 16th December 1687.

**Pettie Bag Office,** one of the branches of the Court of Chancery, was abolished in 1874, and its duties were transferred.

**Pettty Officers** in the Navy hold a similar rank and position to the non-commissioned officers in the army. They are the backbone of the Navy, as the efficiency, smartness, and morale of a ship's company depend in no small measure upon the zeal and discretion of the petty officers. They are now a most highly trained and valuable body of men, and all the warrant officers are drawn from their ranks. They are divided into four classes—viz. chief petty officers, 1st- and 2d-class petty
officers, and leading seamen—and into two branches, the seamen and the so-called non-combatants, which latter includes the artificers, writers, &c. A chief petty officer can only be disrated with the sanction of the commander-in-chief, and in the case of a chief engine-room artificer his disrating must be specially reported to the Admiralty, and he can only be restored to his rank by Admiralty order. All other petty officers can be appointed or disrated by the captain of the ship, except in the case of gunnery or torpedo instructors, who are rated as such for their special qualifications in the gunnery and torpedo schools. The pay of the chief of police (master-at-arms) ranges from 4s. to 6s. a day; that of chief engine-room artificer from 6s. 6d. to 7s. 6d. a day, with an extra penny for each good-conduct badge; a chief gunner or torpedo instructor receives 4s. 2d. a day, with an additional penny for each badge, of which he can have three. A 1st-class petty officer, if a gunnery or torpedo instructor, obtains 3s. 8d. a day, with an extra penny for each badge; if not an instructor, but a trained gunner and torpedo man, 3s. a day; a 2d-class petty officer, if a trained gunner and torpedo man, 2s. 8d. a day, with pay for badges; while a leading seaman receives 2s. 6d. a day, with pay also for badges. A leading stoker receives 2s. 5½d. a day, and if a trained mechanic, 2s. 8d.; a carpenter's mate, 4s. 6d.; and a 1st-class writer, 5s. See WARRANT-OFFICERS.

**Petunia**, a genus of plants of the natural order Solanaceae, natives of the warmer parts of America. They are herbaceous plants, very nearly allied to Tobacco, and with a certain similarity to it in the general appearance of the foliage, which has also a slight viscosity, and emits when handled a disagreeable smell; but the flowers are very beautiful, and varieties improved by cultivation are amongst the favourite ornaments of British greenhouses and flower-borders. The petunias, although annuals or perennials, are very often treated as annuals, sown on a hotbed in spring, and planted out in summer, in which way they succeed very well even in Scotland. They are tall plants, with branching weak stems, and may readily be made to cover a trellis. Though treated as greenhouse plants, they become half-shrubby, they live only two or three years. The name is from the Brazilian *Petun*. The first petunia was introduced into Britain in 1831. There are now many garden varieties with double flowers, individually more durable than the single kinds.

**Petunze.** See Felosper, Pottery.

**Petworth.** A market-town of Sussex, on an eminence near the Weft Rother River, 14 miles NNE. of Chichester. Petworth House, the seat of Lord Leconfield, is an 18th-century mansion, with a fine park and many portraits and other relics of the Percies and Wyndhams. Pop. of parish, 2042. See P. H. Arnold's *Petworth* (1864).

**Pew**, (anciently puzs; Old Fr. prys; Dutch pusz; Lat. podium, 'anything on which to lean'—*appuyer*), enclosed seats in churches. Church-seats were in use in England some time before the Reformation, as is proved by numerous examples still extant, the carving on some of which is as early as the Decorated Period—i.e. before 1200 A.D.; and records as old as 1450 speak of such seats by the name of *puzs*. They were originally benches, usually facing east, with partitions of wainscoting about three feet high, and ends of the width of the seat, panelled or carved; these ends often rising above the wainscoting, and ending in flores-de-lis or 'poppy-heads,' as shown in the illustration.

**Pentinger, Conrad** (1465-1547), a scholarly citizen of Augsburg, and keeper of the archives. He published a series of Roman inscriptions; and at his death the so-called *Tabula Pentingeriaca* was in his possession, in course of being prepared for publication. This remarkable Itinerary (q.v.) is really a Roman map of the military roads of the 3d century A.D., though his copy was probably a 13th-century one. The document was sold by his family, bought by Prince Eugene in 1714, and is now in the Imperial Library at Vienna. It was edited and published by Schley (1733), Mannert (1824), and Desjardins (1869).


**Pews**. The benches here in Pressingfield Church, Harleston, Suffolk, and date from the later half of the 15th century. The back of the one in the engraving is quite a 'poor man's Bible,' being carved with the emblems of the Passion, from the cock crowing to the seamless coat. In later times, rows grew into to large and high seats containing two or more seats, lined with baize, and fitted with doors, desks, and cushions; but these will soon have all been swept away in England under the influence of the restoration movement and of the Free and Open Church Association founded in 1885 for the abolition of appropriated seats. Pews were early assigned to particular owners, but at first only to the patrons of churches. A canon made at Exeter, in 1287, rebukes quarrelling for a seat in church,
and decrees that none shall claim a seat as his own except noblemen and the patrons. Gradually, however, the system of appointment was extended to other inhabitants of the parish, to the injury of the poor, and the multiplication of disputes.

The law of pews in England is briefly this. All church seats are at the disposal of the bishop, and may be assigned by him, by faculty, to persons owning parsonage lands in the parish. Long occupation may give an owner of property a prescriptive title to a pew. Subject to rights acquired by faculty or prescription, the churchwardens are required to find seats for the parishioners, according to their degree; they may assign a pew to a parishioner, but not to a stranger. In England, pew-rents are recalled. In new churches pews may be assigned and pew-rents levied under several acts of parliament. See Dale's Clergyman's Handbook. It appears that by common law every parishioner has a right to a seat in the church, and the churchwardens are bound to place each one as best they can. The practice of letting pews, except under the church-building acts or special local acts of parliament, and, much more, of selling them, has been declared illegal.

In some parishes in the parish churches are assigned by the Heritors (q.v.) to the parishioners, who have accordingly the preferable claim on them; in towns the practice is to let them annually. As is well known, pews in dissenting churches are rented as a means of revenue to sustain general charges. In some parts of the United States pews in churches are a matter of annual competition, and bring large sums. Latterly, in England, there has been some discussion as to the injuriously exclusive character of the 'pew system,' and in many churches the open seats or chairs are unappropriated and distributed to all comers as a matter of ritualistic churches the sexes are divided, as in some country churches has been the case with the pews in churches where pre-Reformation days. In the Roman Catholic churches on the Continent pews are seldom to be seen.

Pewsey, a small market-town of Wiltshire, in a fertile vale, 18 miles E. of Devizes and 7 SSW. of Marlborough. Pop. of parish, 1853.

Pewter, a common and very useful alloy of the metals tin and lead. See Alloy.

Pézenas, a town of France (dept. Hérault), on the left bank of the river Hérault, 32 miles by rail SW. of Montpellier. The vicinity produces excellent wine, and woollen and linen goods are manufactured. Pézenas is one of the principal brandy-markets of Europe. Here Molière wrote Les Précieuses Ridicules. Pop. 6538.

Pfiffers, hot springs in the canton of St Gall, Switzerland, in the deep and gloomy gorge of the Tamina torrent, which joins the Rhine at Ragatz, 25 miles to the north. They were discovered towards the middle of the 11th century, and have been used ever since. Patiens used formerly to be let down by ropes, but they can now approach by a good road. The water (97° F.) is conducted in pipes to Ragatz, though there are bath-houses (1794) in the ravine. Near the village of Pfiffers (pop. 1628), which stands above and outside the ravine, is a Benedictine abbey, founded in the 8th century, but converted into a lucrative asylum after its dissolution in 1838.

Pfalz, the German name for the Palatinate (q.v.).

Pfalzgraff See Palatine.

Pfeiffer, Ida (née Reyer), a celebrated female globe-trotter, was born at Vienna, October 15, 1797. In 1820 she married an advocate named Pfeiffer, from whom she was obliged to obtain a separation. When she had settled her two sons in life, she proceeded to gratify, at the age of forty-five, her long-cherished inclination for a life of travel and adventure. Her first expedition was to the Holy Land in 1842. She tributed her eastern rambles in the following year, which, like all her other works, went through many editions, and was translated into French and English. In 1845 she visited northern Europe—Sweden, Norway, and Lapland. In 1847 Pfeiffer published her impressions in another book, Scandinavien und Island (2 vols. 1846). Resolving in 1846 on a voyage round the world, she started from Hamburg in a Danish brig for Brazil. She then sailed round Cape Horn to Chili, thence across the Pacific to the United States, and thence via the Mediterranean to France, and again embarked from Calcutta, via Persia, western Asia, southern Russia, and Greece, and re-entered Vienna in 1848. Two years later she published a narrative of her travels and adventures, entitled Eine Frauenfahrt um die Welt (3 vols. 1850). Meine Zweite Weltreise (1856) describes a second journey round the world from England by the Cape to Java, Borneo, California, Peru, and the United States (1851-54). In 1856 she set out on what was to be her last expedition—namely, to Madagascar. After enduring terrible hardships, she got away, and came home to Vienna—to die, October 29, 1858.

Pfeiffer, Otto, a great philosophical theologian of Protestant Germany, born at Stettin, near Cannstatt in Württemberg, September 1, 1838; studied under Ban, at Tübingen, from 1857 till 1861, and next paid a visit of study to England and Scotland; became pastor at Heilbronn in 1868, and superintendent at Jena in 1870, an office which he held the same year in exchange for the chair of Theology there. In 1875 he was called to be professor of Systematic Theology at Berlin. In New Testament criticism Pfeiffer belongs to the younger critical school which has grown out of the impulse given by Baur. But he is not the less an independent thinker, acute, suggestive, and profoundly learned, and he has made his name as well known in England and America as in Germany by a series of works which no serious student of philosophy or theology can afford to overlook. Of these the chief are Die Religion, die Wissen- schaft und Geschichte (2 vols. 1869; 2d ed. 1875); Der Paulinismus (1873; 2d ed 1890; Eng. trans. 2 vols. 1877); Religions-philosophie auf geschichtlicher Grundlage (2 vols. 1875; 2d ed. 1884-85; Eng. trans. 4 vols. 1890-92); Zur religiösen Verständ- lichung (1879); Die Wissenschaft der Geschichte und Stättelehre (1890; 4th ed. 1898); The Influence of the Apostle Paul on Christianity, the Hibbert Lectures for 1885; Das Unchristentum (1887); The Development of Theology since Kant (Lond. 1890); and The Philosophy and Development of Religion, the Gifford Lectures for 1884.

His brother, EDMUND PFIEFFER, born at Stettin 12th October 1842, studied at Tübingen, and after a short experience as a pastor was made professor of Philosophy at Kiel in 1873, whence he was called to Tübingen in 1877, where he has since then been a professor. He has written various studies on Leibnitz (1870), on Empiricism and Scepticism in Hume's Philosophy (1874), modern Pessimism (1875), Kantian criticism and English philosophy (1881), Arnold Geulinx (1884), Lotze (2d ed. 1884), Heracleitius of Ephesus (1890), &c.

Pforzheim, the chief manufacturing town of Baden, stands at the southern end of the Black Forest, 20 20 miles SE. of Karlsruhe by rail. It contains the remains of an ancient castle, from 1300 to 1553 the residence of the Margraves of Baden-Durlach, and was the birthplace of Rechlin. The town is famous for the manufacture of gold and silver ornaments, in which 8000 people are employed, and has further chemical and iron
Phaeodrus

Phaeodrus (or Phædrus, according to some scholars), author of a translation of Esop's fables in Latin verse, was, by his own account, a Macedonian, who from his childhood was trained in the Greek culture. While still young he came to Italy, and in Rome or some other city attended school where he studied Koinos, whom he quotes in the epilogue to his third book. From the title of the entire work, Phaedia Augusti Liberii Fabulæ, it appears that the stories have been arranged in the frequent order of the Alexandrian Mis, that is, of the Emperor Claudius, and that his brother Sejanus, the successor of Sejanus, either the first of that name or his successor Tiberius. Under the reign of this latter he published the first two books of his fables, but his biting though veiled allusions to the tyranny of the emperor (in the fable of the frogs asking a king) led to his minister Sejanus (in that of the jay dressed in peacock's plumage) caused him to be hated at court, then accused, and finally condemned—to what punishment is unknown. On the death of Sejanus he resumed publication, and dedicated his third book to one Empoleon, freedman of the Emperor Claudius, courting his protection from enemies and accusers. In the last years of his life, to which the fourth and fifth books belong, he seems to have regained liberty of pen as well as of person. He died probably at an advanced age. Phaeodrus was more than his claims to be—a reproduction of Esop; he invented fables of his own, and gave an Esopic turn to contemporary events. That the five books traditionally ascribed to him are his cannot with any large deductions be maintained—not a few of them may have been added as the Fabulae in their various common as an appendix to the five books, and found in an anthology attributed to Nicola Perotti, a scholar of the 15th century. The merits of Phaeodrus are his clear succinct narrative, his pure Latinity, and his skill in versification. Those who have put an end to all the doubts and finally of Müller have been ably cleansed by his latest and most helpful editor Ramorino (Turin, 1884).

Phæthon ('the shining'), in the writings of Homer and Hesiod, a frequent title of Apollo the sun-god, and subsequently employed as his name. Phæthon, in Greek mythology, is also the name of a son of Helios, famous for his unfortunate attempt to drive the sun's chariot. Seaward had the pre-

Phaecina. See Ulcers.

Phægeceytes, the white or colourless blood-corpuscles, which are also called leucocytes. They are active ameboid cells, and engulf both nutritive and harmful particles. Since the researches of Metchnikoff the physiological importance of these elements has been increasingly appreciated. Thus, it is generally recognised that the destruction of invading bacteria is due to the health and activity of the phagocytes. See Blood.

Phalacerobius. See Cormorant.

Phalanx, the Linear genus including Moths (q.v.).

Phalanger (Phalangista), a genus of small arboreal marsupials, of which many species are found in Australia and the islands to the north of it. All the species have long prehensile tails, and many grasp their food and convey it to the mouth with the forepaws. They feed usually on the young shoots and leaves of the trees in which they live, but in captivity they do not refuse animal food. The Vulpine Phalanger (P. vulpinus) is very common in Australia, and is used by the natives for food. The Dormouse Phalanger (P. mus), which is only six inches in length, resembles the common dormouse in habits and appearance. See also (under Flying Animals) FLYING PHALANGER.

Phalansterie. See FOURIER.

Phalax, the ancient Greek formation for heavy infantry, was a series of parallel columns standing close one behind the other, the whole owing to its depth of line and capable of penetrating any line of troops. The oldest phalax was the Lacedemonian or Spartan, in which the soldiers stood four, six, or, more generally, eight deep. The Macedonian phalax, the latest form, was sixteen men deep. The arms of the men were swords, shields, and long pikes or spears. The heavy-armed phalax was ordinarily flanked by peltastes or light infantry, similarly formed, who usually fought with javelins and slings.

Phalaris, tyrant of Agrigentum, in Sicily, who flourish about the middle of the 6th cent. B.C., was born on a small island near Cnidus, on the coast of Asia Minor, and whilst basking in the sun and enjoying the delights of the citadel of Agrigentum made himself master of the city. He greatly embellished it, and extended his power over large districts in Sicily. But after holding power for sixteen years he was overthrown, for his cruelties, by noble families of the island, and was soon after dead. The tradition points probably to the religious sacrifice of human victims to Ialor or Moloch (q.v.). Later ages represent Phalaris as a humane and enlightened ruler. But the 148 letters bearing his name were preserved by Bentley (q.v.) in 1657 and 1669 to be spurious, and to have been composed several centuries after Phalaris died. See Bentley's Dissertation, edited by W. Wagner (Lond. 1883).

Phalacrocorax. See Cormorant.

Phalaena, the Linear genus including Moths (q.v.).

Phalanger (Phalangista), a genus of small arboreal marsupials, of which many species are
when Mythology (q.v.) was universally considered to contain the teaching of ancient sages couched in the form of allegory, and everything in mythology was regarded as the offspring of fancy and hidden truth, phallic worship was naturally conceived to conceal some esoteric teaching as to the mystery of the transmission of life. But this view of mythology is dissipated by an examination of the manner of life and mode of thought of those savage peoples from the second to the 18th century, which, on the whole, was a practical one. The animal and vegetable, the plains and mountains, the2 were the centres of the inhabitants' attentions. They were not concerned with abstract ideas, but with practical matters, and their religious views were always practical. They believed in the existence of a god who could protect them and bring them good fortune. This god was worshiped in various ways, such as offering sacrifices, making offerings, and performing religious ceremonies. These practices were not seen as something abstract or theoretical, but as something that could bring them tangible benefits.

Phallus, a genus of fungi. See FUNGI.

Phalsbourg, or Pfalzberg, a town of Loraine, on the north-west arm of the Vosges, 25 miles N.W. of Strasburg. It was fortified by Vauban in 1680; invested, but not taken, by the Allies in 1814-15; and bombarded and taken by the Germans in 1870, after which they razed the fortifications. It was the birthplace of Eckermann, and is widely known through his travels and the other writings of the Eckermann-Chantren novels Pop. 3680.

Phanariots. See FANARIOTS.

Phanerogamia (Gr. phaneroe, 'manifest,' gamos, 'marriage') are those plants which bear flowers and produce seeds. But, for the differences and the resemblances between the flowering and seeding of these plants and the spores of Cryptogams, see CRYPTOZAMIA, FLOWER, GYMNOSPERMS, SEED.

The group includes the following sets of plants: A. Gymnosperms (q.v.), with naked ovules—e.g. conifers; B. Angiosperms (q.v.), with ovules enclosed in ovaries: (1) Monocotyledons (q.v.), with one cotyledon—e.g. lilies, grasses, orchids; (2) Dicotyledons (q.v.), with two cotyledons—e.g. buttercups, roses.

Pharaoh, the English spelling of the name given by the Hebrews to the monarch ruling in Egypt at the time, sometimes as if it were a proper name, though really an official title (from the Egyptian Peres or Pheres). The greatest difficulty that has been encountered in attempting to determine the particular monarchs who pass under this name in the Scriptures. See EGYPT.
was no need of any future reward. While the Pharisees held all the traditional ordinances in equal reverence with the Mosaic institutions, the Saddu- cees rejected, or rather varied some of these according to the traditions of their respective families, and treated religious observances, certain laws of purity, and some parts of the civil law. It may perhaps be assumed (as by Geiger) that the Pharisees were the representatives of a newer Halaeha, inspired by an oppositional attitude towards the national zeal and sentiment. Certain other legal differences between the two parties; such as the application of the laws of inheritance to daughters, or of the responsibility of the master for his servants, are nothing more than political party-views in a religious mask, which were meant to meet certain special isolated cases only. In general the Pharisees handled justice in a much milder manner than their antagonists, who took their stand upon the rigid letter, and would hear of no mercy where a violation of the osle was clearly manifest. Out of the midst of the Pharisees sprang the great doctors and masters of the Law (Heb. šopherim; Gr. nomoi<ıkaiou, ‘teachers of the law,’ usually rendered ‘scribes’), and to them were entrusted by the later rulers the most important offices. The greatest misconception has prevailed especially with respect to the coming together of these three groups, that of the Pharisees, Sadducees, and the general community as the ‘plague of Pharisaism.’ Pharisaism—from which gradually branched off the wld democratic party of ‘Zealots’ (Krutaim) in the revolution of Bar Cochba (q.v.)—has, from the final destruction of the commonwealth to this day, remained the principal representative of Judaism as a creed.

See JEWS, TALMUD; Schürer’s History of the Jewish People in the Time of Jesus Christ (Eng. trans. 5 vols. 1886-90).

Pharmacopoeia. This term has been applied to the regulation of the medical art in two respects: (1) a list of the articles of the Materia Medica, whether simple or compound, with their characteristics, their modes of preparation, and the tests for the determination of their purity; and (2) a collection of approved receipts or prescriptions, together with the rules for compounding articles in the Materia Medica. Almost every civilised country of importance has its national pharmacopoeia; those of the United States (6th ed. 1883), Germany (3rd ed. 1860), and France deserving special mention. The earliest pharmacopoeias were prepared by the Arabs from the 9th to the 12th century, and subsequently by the medical school of Salerno. The first pharmacopoeia published under authority appears to have been that of Nuremberg in the year 1542. Valerius Cordus, afterwards professor at Witten- berg, but then a student, showed a collection of medical receipts, which he had selected from the works of the most eminent writers, to the physi- cians of Nuremberg. The latter were so struck with its value that they urged him to print it for the benefit of the apothecaries, and obtained for his work the sanction of the city council. Before this time the books chiefly in use among apothecaries were the treatises: On Simplex by Avicenna and Serapion; the Liber Serratoris of Baehdemon ben Aberazerim; and the Antidotarium of Nicolas de Salerno, arranged alphabetically. The work was commonly called Nicolaus Magnus, to distinguish it from an abridgment known as Nicolaus Pareus.

Confining our remarks to the British Pharmacopoeias, we may notice that the first edition of the London Pharmacopoeia (or, more correctly speaking, of the Pharmacopoeia of the London College of Physicians, &c.) was prepared chiefly on the works of Meuz and Nicolas de Salerno. Successive editions appeared in 1637, 1635, 1650, 1657, 1721, 1746, 1757, 1699, 1824, 1836, and 1851, and form an important contribution to the history of the progress of pharmacy and therapeutics, and to the development of the medical art. The nature and the number of the ingredients that entered into the composition of many of the pharmaceutical preparations of the 17th and 18th centuries would astonish most of the practitioners and patients of the present day. In the earlier serving, and dispensing of medicines. In sales.

The Edinburgh Pharmacopoeia is more modern than the London, the first edition having appeared in 1668, while the Dublin Pharmacopoeia date far back than 1807. The latest editions of these works appeared in the years 1841 and 1850 respectively.

Until the Medical Act passed in 1858, the right of publishing the pharmacopoeias for England, Scot- land, and Ireland was vested in the Colleges of Physicians of London, Edinburgh, and Dublin respectively; and as these three pharmacopoeias contained many important preparations, similar in name but totally different in strength (as, for example, dilute hydrochloric acid, solution of hydrochloraie of morphia, &c.), many publications arose from a London prescription being made up in Edinburgh or Dublin, or vice versa. By that act it is ordained that ‘the General [Medical] Council shall cause to be published, under their direction, a book containing a list of medicines and compounds, and the manner of preparing them, together with the weights and measures by which they are to be prepared and mixed; and containing such other matter and things relating thereto as the General Council shall think fit, to be called British Pharmacopoeia.’ And by a subsequent act it is ordained that ‘the British Pharmacopoeia shall for all purposes be deemed to be substituted throughout Great Britain and Ireland for the several above-mentioned pharmacopoeias.’ The British Pharmacopoeia, which appeared in the beginning of the year 1864, gave rise to such a general feeling of disappointment throughout the profession that the General Council brought out a new and amended edition in 1867. A second reprint with additions appeared in 1874. Another edition was published in 1885, and a supplement to it in 1890. There are also Homeo- pathic and Veterinary Pharmacopoeias (1813), and Pharmacopoeias for the London and other hospitals, but those are not printed by authority, nor authorised in any way by government.

The Pharmacopoeia of the United States is drawn up by a national convention consisting of delegates from the respective medical colleges, medical corpora- tions, and universities throughout the United States. It was first published in 1820, and a second edition appeared in 1828, but it is now revised every ten years, a new revision appearing in 1893.

Pharmacy, a department of the medical art which consists in the collecting, preparing, preserving, and dispensing of medicines. In almost Britain the practice of pharmacy is regulated by a
PHAROS

series of Pharmacy Acts, of which the more important are those of 1852, 1868, 1869, and 1882. See ADULTERATION, CHEMISTS AND DRUGGISTS, MEDICINE, PHARMACOPÆIA, PRESCRIPTION.

Pharos. See Alexandria, and LIGHTHOUSE.

Pharsalus, now Febrala, a town of Thessaly, to which were laid the first plain of the battle of the Salamis, and accordingly in the part of Thessaly restored to Greece in 1881; hence the Greeks had to retreat in April 1897. The district, Pharsalia, is historically notable mainly for Cæsar's great victory over Pompey, August 9, 48 B.C. See Lucanus.

Pharynx (Gr.) is the name of that part of the alimentary canal which lies behind the nose, mouth, and larynx. Its nature and functions are described in the article DIGESTION, where an illustration will also be found. In cases of Diptheria (q.v.) the pharynx is usually the chief seat of the disease. It is liable to ordinary inflammation or pharyngitis—an affection characterised by pain, especially in swallowing, without redness in the fauces or change of voice. Sometimes it proceeds to suppuration, and abscesses are formed. See QUINSY, THROAT.

Phascologale, a genus of marsupial quadrupeds allied to the Dasyures (q.v.), and containing, according to the most reliable estimate, thirty-five species, all of which are arboreal and insectivorous; they are spread through the Papuan islands and Australia. The best-known form is perhaps the 'Tapan Tafa' (P. penicillata), of the size and appearance of a rat, which commits depredations in the storehouses of Australian colonists, and is of the fiercest disposition when meddled with. This marsupial has a curious resemblance to the rodent genus Hapalotis, also found in Australia. It may be a case of ' mimicry ' between some of the species.

Phascolomyus. See WOMAATS.

Phases (Gr. phasis, 'appearance'), the different luminous appearances presented by the moon and several of the planets, sometimes the whole, a part, or none of the luminous surface being seen from the earth. See MOON, PLANETS.

Phasianidae. See PHEASANT.

Phasis, a river in Colchis, now called Rion or Paza. It rises in the Caucasus, and flows west into the Euxine near the ancient city of Phasis.

Phasme (Gr. phasma, 'a spectre'), a family of insects, including walking-stick insects (Bacillus and Bactaria), spectre-insects (Phasna), and leaf-insects (Phyllium). With the exception of Bacillus, which occurs in south Europe, they occur in the tropics—in South America, Borneo, East Indies, &c. As their names suggest, they have a striking resemblance to the twigs and leaves of the plants on which they feed and live. See LEAF-INSECT, MIMICRY.

Pheasant (Phasianus), a genus of gallinaceous birds of the family Phasianide; having a rather short crest, or line of black feathers in the skin surrounding the eyes destitute of feathers, and warty; the wings short; the tail long, its feathers so placed as to slope down, roof-like, on either side, the middle feathers longest; the tarsus of the male furnished with a spur. The males of all the species are brilliantly variegated; the female pheasants have shorter tails and dull or sombre colours. There are numerous species, natives of the warm and temperate parts of Asia. The Common Pheasant (P. colchicus) is said to have been brought from the banks of the Phasis, in Colchis, to the scenes of Europe, at a very remote period, its introduction being ascribed in classic legend to the Argonauts. From the Phasis it derived its Greek name Phasianus, the origin of its name in English and other modern languages. It was soon naturalised in Europe, and is now diffused over almost all the temperate parts of it. The date of its introduction into Britain is not known, but was certainly earlier than 1199, when King John granted William Brewer a licence 'to hunt the hare, fox, cat, and wolf, throughout all Devonshire, and to have free warren throughout all his own lands for hares, pheasants, and partridges' (Dugdale's Baronage, vol. i. p. 791). Strangely, however, the pheasant seems never to have been considered a royal dish till 1689. It has long been plentiful in plantations and game-preserves, and has been introduced into almost every part of the country suitable to its habits. The abundance of pheasants in Britain, however, is to be ascribed chiefly to careful game-preservation, without which the race would in all probability soon be exterminated. No kind of game fails so easily a prey to the poacher, for in its present method of rearing it is semi-domesticated, though we can hardly include it amongst our domesticated fowls.

A minute description of the common pheasant is unnecessary. The feathers on the upper part of the head are brownish green, with edgings of yellow; the neck has variations of green and blue, with reddish orange below; the breast and sides are variegated with brownish grey and purplish blue; the back and belly are variegated, the rump deep red with green and grayish reflections; the tail is dull greenish yellow, with yellowish grey, and bars of black, and a band of dull red on each side. The whole length of a male pheasant is about 3 feet, of which the tail measures about 18 inches. The entire length of the female is a little more than 2 feet, principally in that the tail is much shorter than in the male. The general colour of the female is pale grayish brown and yellow, variegated with darker brown, the sides of the neck tinged with red and green. The ordinary weight of a pheasant is about two pounds and a half; but when pheasants are abundantly supplied with food, and kept undisturbed, they are sometimes four pounds or four pounds and a half in weight. The pheasant, unlike the partridge, is polygamous.

The nest of the pheasant is on the ground, and is a rude heap of leaves and grasses, in which eleven or twelve olive-brown eggs are laid. But in the half-domesticated state in which it exists in many English preserves the pheasant does not pay that attention to its eggs and young which it does when more wild, and not unfrequently continues to lay eggs for a considerable time, like the domestic fowl; the eggs being removed by the gamekeeper, and hatched by hens, along with eggs from nests found

Common Pheasant (Phasianus colchicus), male and female.
among clover and hay in the season of mowing. In fact, where pheasants are reared in large numbers nearly all the birds are hatched by either common hens or hatched in the incubator, the object being for the purpose. In the former method coops are employed, in which there are runs formed by wire netting, and in this way a large number can be attended to at one time. Very young pheasants must be carefully supplied with ant's eggs, maggots, gypsy, and other insects and fruits of trees, until they are in their earliest stage. The difficulty of rearing birds bred in confinement has led to the introduction of various forms of artificial food, several of which are excellent. Custard is largely employed, and when given fresh is eaten with avidity, and brings on the young birds rapidly. Canary-seed is good also at first. Pheasants feed very indiscriminately on berries, seeds, roots, young shoots of plants, worms, insects, &c. Beans, peas, corn, and buckwheat are frequently thrown for them in open places in woods; and they scrape up bulbs and tawny roots in winter. They roost in trees at no great height from the ground, and pheasants sometimes capture them by burning sulphur below them. During the molting season they do not ascend trees to roost, but spend the night on the ground, when they fall a ready prey for foxes. They breed in the woods with a thick undergrowth, in which, when disturbed, they naturally seek shelter, running whilst it is possible, rather than taking flight. The male pheasant takes flight much more readily than the female, which, apparently instinctive to her brown colour to escape observation, often remains still until the sportsman is almost upon her. The males and females do not associate together except during the breeding season, but small numbers of one sex are often found in company.

The 'short crow' of the males begins in May. In Scotland pheasant-shooting legally begins on the 1st of October, and ends on the 3d of February. The pheasants turned out from the gamekeeper's breeding-yard into a preserve are in general supplied with abundance of food during winter, and come to the next season called as well as any kind of poultry, so that the sportsmanship of a Battue (q.v.), in which they are killed by scores or hundreds, is of the lowest kind. Maize is one of the best foods, but barley, peas, wheat, and oats, with the usual green food, are all employed. Some pheasants are supposed to have been produced by any kind of poultry, so that the sportsmanship of a Battue (q.v.), in which they are killed by scores or hundreds, is of the lowest kind. Maize is one of the best foods, but barley, peas, wheat, and oats, with the usual green food, are all employed.

Breeding: Pheasants are chiefly kept in aviaries as ornamental fowls, for which purpose they are well adapted. A recent introduction, the Prince of Wales Pheasant (P. pruinosus), was discovered on the Afghan frontier of India, and is distinguished from all other pheasants in that the greater part of its wings are white, though it is somewhat different in its markings and the arrangement of its colours.

See D. G. Elliot, Phasianides (1780–72), Tegetmeier, Pheasants (1875); Price, Pheasant-rearing (1888); Macpherson and others, The Pheasant (1895).

PHELS: Ephraim, an American author, was born 21st August 1844, at Andover, Massachusetts, the daughter of Professor Austin Phelps and of the authoress of Sunny Side. Besides lecturing and engaging in work for the advancement of women and for social reforms, she has written numerous juvenile works. The Journal of a Summer After (1868), which passed through twenty editions in the year of its publication; Beyond the Gates (1883); The Gates Between (1887); Hedged In and The Silent Partner (1870); The Story of Aris (1877); Doctor Zay (1884), in which the question of polygamy is powerfully handled; and The Forsaken (1890), in conjunction with her husband, the Rev. Herbert D. Ward, Come Forth, a travesty of the story of Lazarus, and The Master of the Magicians.
Phelps, Samuel, the last of the old school of actors, was born 13th February 1854 in Devonport. When seventeen years old he came to London, and was engaged on the Globe and Sun newspapers as reader; among his companions being Douglas Jerrold, then, like himself, a stage-struck youth. After some years spent in the York circuit in the autumn of 1856, and continued in the provinces for eleven years. On 28th August 1857 he made his debut in London as Shylock at the Haymarket, under the management of Barham and Williams, making a very great success. He was afterwards engaged by Macready, but his genius did not get full scope until the beginning of his famous Sadler’s Wells management, one of the most extraordinary achievements in the history of the drama. At an outlying unfashionable and unpopular theatre he for eighteen years produced a constant succession of ‘legitimate’ plays, attracting around him an excellent company, and educating a rough and unpolished audience to appreciation of the masterpieces of English dramatic literature. He began this apparently unpromising enterprise at the end of 1854, continued as manager till March 1862, and made his last appearance before his Islington friends on 6th November 1862. During his management he produced no fewer than thirty-one Shakespearean plays, as well as works of the other great Elizabethans, and of the dramatists of the 18th century. Being engaged to Colman after leaving Sadler’s Wells Phelps did not attach himself to any particular theatre, appearing at Drury Lane, the Queen’s, and the Gaiety theatres, and playing regularly in the provinces. On 1st March 1878, when acting Wolsey at the Aquarium (Imperial) Theatre, he broke down, and never played again. He died on 6th November 1878. Although primarily a tragedian, Phelps was an excellent all-round actor, and some of his comedy parts are among his most notable—as, for instance, Malvolio, Baitoum, i.e. Shallow. In tragedy he was famous in Wolsey, Lear, Macbeth, Brutus, Luke (City Madman), and Sir Giles Overreach; while among his other chief successes were Richelieu, Sir Pertinax Macysophant, Bertuccio, Ohi Dormont, and Job Thornebery.

Phenacodoe, by J. and E. Coleman (1880); and Life and Letters, by W. May Phelps and John Forbes Robertson (1886).

Phenacit, a drug prepared from carbolic acid, valuable in fevers, and, like antipyrin, of service in stilting pain and securing rest in cases of severe headaches, insomnia, and nervousness.

Phenacodins. See MAMMALS.

Phenol. a name for Carbolic Acid (q.v.). See also AROMATIC SERIES; and for the Phenol Dyes, DYEING, Vol. IV. p. 141.

Pherec, a powerful city of Thessaly, near Mount Pelion; according to legend, the ancient royal seat of Acredus and Acoleus, and after- wards of political consequence under ‘tyrants’ of its own, who long made their influence felt in the affairs of Greece, and repeatedly attempted to make themselves masters of Thessaly. One of these tyrants, Alexander (slain 357 B.C.), is par- ticularly celebrated for his cruelties.

Pherecydes, an ancient Greek philosopher, born in the island of Syros, in the 6th century B.C., author of the Politeia. He taught the doctrine of the existence of the higher soul after death; but it is uncertain if he held the doctrine of the transmigration of souls, afterwards promulgated by his disciple, Pythagoras. Of his work, a mythological system of philosophy, only frag- ments are extant, collected and edited by Sturz (2d ed. Leip. 1824).—Another Pherecydes, a native of Leros, who lived in the 5th century B.C., com-

Phidias (Gr. Φιδίας), the greatest sculptor of ancient Greece, was born the son of Charimdes, at Athens about 500 B.C. His instructor in sculpture was Ageleus of Argos. To Phidias came an opportunity such as falls to the lot of few artists: Pericles, having risen to the head of affairs in the Athenian state, devoted to the adornment of the temples and other public buildings fitting for the vanquisher of Persia, and he not only gave to Phidias a commission to execute the most splendid statues that were to be erected, but made him general superintendent of all the public works planned for the city. Phidias was to execute for the Parthenon at Athens, a vast colonnade of Doric columns, the frieze of the Temple of Zeus at Olympia, a series of small statues for the Parthenon, a vast marble statue of Nike on the Acropolis, a great golden statue of Athena on the Acropolis, and a colossal figure of Athena Promachos on the Acro- polis at Athens, a great golden statue of Athena Promachos on the Acropolis at Athens, a monument of the victory of Marathon at Delphi.
PHILADELPHIA

and numerous others. Their prevailing characteristics appear to have been an ideal simplicity, and every piece relays that we possess are the most noble specimens of sculpture in the world. In 1888 there was dug out at Tanagra a red vase bearing what was believed to be the signature of Phidias. See SCULPTURE.

See A. S. Murray, Greek Sculpture (1880); G. Waldstein, Essay on the Art of Phidias (Camm. 1883); and Cobden, Phidias (Paris, 1886).

Phialgia, an ancient town of Arcadia, situated in its extreme south-west corner. From its temple of Apollo, at Basse, 5 to 6 miles distant, a sculptured frieze representing the contests between the Centaurs and Lapithes, and the Amazons and Greeks, was sent to the British Museum in 1812. The temple was first described by Chantler in 1765. Next to the Theseum at Athens it is the most perfect architectural ruin in all Greece, being built of fine gray limestone and white marble. It was designed by Ictinus, one of the architects thus the Parthenon at Athens, and originally 125 feet long and 43 broad, and had 15 columns on each side and 6 at each end, in all 33, of which 31 still stand. See Cockerell, Temples of Agina and Bucea (1860).

Philadelphia. See HIGHLAND COSTUME.

Philadelphia, the chief city of Pennsylvania and the third city of the United States in population, is bounded by the Schuylkill River, about 100 miles (vai Delaware Bay River) from the Atlantic Ocean, 90 miles by rail SW. of New York City and 136 miles NE. of Washington, D.C. Philadelphia is a city of Philadelphia, is a city lying along the Delaware from the mouth of the Schuylkill River at League Island, northward, for about 15 miles, and has an average breadth of some 8 miles. Its total area embraces nearly 130 sq. mi., about one-eighth of which is comprised within the limits of the thickly built up portions of the city, while the rural sections consist of suburban communities, which, though within the city limits, are locally known by the names they bore prior to their annexation to the city. Philadelphia is notably a city of homes.
Medical College (1869), the Medico-Chirurgical College (1880), the Woman's Medical College (1850), and the Philadelphia Polyclinic and College for Graduates in Medicine.

Manufactures, Commerce, &c.—Though in its early history Philadelphia was renowned for its extensive shipping interests, as compared with those of its sister cities, it is rather as a manufacturing than as a commercial city that Philadelphia holds a present prominence. Here are immense establishments covering acres of ground, from which millions of dollars worth of products are issued annually for the home and foreign markets, besides smaller concerns innumerable. The aggregate capital employed in manufacturing is estimated at $300,000,000, the number of hands employed at 250,000, and the value of the annual product at $600,000,000. Among the prominent industries of this class are the building of locomotives, of which $10,000,000 worth are constructed annually, employing some 5000 men; the manufacture of carpets, at which about 30,000 hands are employed, producing annually goods valued at about $50,000,000; woolen and worsted goods, employing 35,000 hands, and valued at $45,000,000; upholstery goods, valued at $25,000,000; cotton goods, $15,000,000, &c. General iron, steel, and steel products are computed to employ 40,000 hands, whose product reaches $75,000,000 in value—the single article of saws, principally made by one firm, giving employment to 500 workmen, and amounting in value to $28,000,000. There are several extensive sugar-refineries, oil-refineries, breweries, and great chemical works. The Commercial Museum, organised under ordinance of Philadelphia councils, collects trade samples of goods made and sold abroad, and of the natural products of foreign countries, and supplies information about foreign commerce and commercial openings, with especial reference to American exports.

The value of the exports for the fiscal year 1889-90 was $16,927,610; for 1879-80, $14,940,023; for 1869-70, $27,410,583. The imports for 1869-70 were valued at $14,433,211; for 1879-80, $35,944,500; for 1889-90, $33,936,317. In 1897 the total value of the foreign trade of Philadelphia was $86,496,042, including exports and imports; in the same year 5906 vessels entered and 5904 cleared the port.

Eminent Philadelphians have been: John the explorer; General McClellan; Dr Morton, of anaesthetic fame; the actors Elwin Forrest, Joseph Jefferson, and Hermann Vezin; Henry George; Charles Hodge; C. G. Leland; Kate Douglas Wiggin; and Frank Stockton.

The city government is almost entirely administered by the mayor through various departments—of public works and of public safety; each administered by a director who is appointed by him; of receiver of taxes, of city treasurer, of city controller, and of law, whose heads are elected for three years; a department of education governed by a board of 38 members (one from each city ward), whose members are appointed by the judges of the courts, and who serve without compensation; a department of charities and correction, whose officials are appointed by the mayor, and who serve without compensation; and a sinking fund commission. The legislative branch of the city government consists of a council of 38 members (one from each ward), who are elected for three years, and a chamber of common council of 135 members, who are elected for two years, all of whom serve without pay. The judiciary of the city and county consists of twelve judges of the Courts of Common Pleas and four judges of the Orphans' Court, all of whom are elected for ten years. There are besides twenty-eight magistrates elected for five years.

Founded in 1852 (see PENN), Philadelphia the year after was made the capital of Pennsylvania, and soon became a place of importance. It was the central point in the war of independence, and the city still preserves the Carpenters' Hall (1770), where the first congress met (4th September 1774), and the old State House (1735), with its Liberty Bell, where the Declaration of Independence (see INDEPENDENCE DAY) was adopted in 1776, and which has since been famous as Independence Hall.

At Philadelphia, moreover, the federal union was signed in 1778; and here, too, the constitution was framed, in 1787. An interest of another kind attaches to the fact that the Protestant Episcopal Church of North America was organised here in 1766. From 1790 to 1800 Philadelphia was the federal capital; and the first mint was established here in 1792. Later events have been the holding of the Centennial Exhibition, in 1876, and the commemoration of Penn's visit, in 1882. Pop. (1700) 4500; (1800) 76,250; (1860) 568,034; (1880) 847,170; (1890) 1,046,964; (1900) 1,295,997.

See Schard and Thompson's History of Philadelphia (3 vols. 1884); Philadelphia and its Environs (Lippincott, 1896); and works by Hazard (1879), Westcott (1877), Cook (1882), Woolsey (1888), and Agnes Repplier (1889).
Philadelphia, in Asia Minor. See Alabster.

Philadelphia, a mystic sect emphasizing 'brotherly love' (Gr. philadelphia), founded in London in 1692 under the influence of Boehme by Dr John Pordage (1608-98) and Mrs Leaule and others. It had for a time a branch in Holland, but disappeared early in the 18th century.

Philemon, a short epistle addressed to Philemon, a man of wealth and liberality, who had been a convert of the apostle, and is now addressed by him as his fellow-worker. It was at Philemon's house, and perhaps under his presidency, that the Christians of Colossae held their meetings. In the Apostles' Constitutions he is represented as bishop of Colossae, and subsequent tradition has it that he suffered martyrdom there under Nero. Philemon had possessed a slave called Onesimus, who, after losing his master, had run off and found his way to Rome (or Cassarae), where there had been an influence under the influence of Paul, and been converted to Christianity. At first the apostle seems to have been minded to retain Onesimus for his own service, but on further consideration he resolved to send him back to his former master, and accordingly made him the bearer of the epistle before us, in which Paul the aged asks pardon for the runaway, and entreats the injured master to receive him 'not now as a servant, but above a servant, a brother beloved.' The epistle exhibits fine delicacy and tact throughout, and has been characterised by Renan as 'one of the most exquisite in the New Testament.' Its genuineness may be said to be well established. Some writers, indeed, in the fourth century held that it was too trifling and unedifying to have been written by Paul; but the arbitrariness of this criterion was pointed out by Jerome, Chrysostom, and others. Baun also regarded it as a literary invention intended to illustrate the ideal relation of master and slave; but this view is not strongly urged by any of the expositors, while some of them (Hilgenfeld and Holtzmann) have entirely abandoned it. There are commentary notes on the Epistle to Philemon by Meyer, Bleek; Elliott (Philothea, Colossians, and Philemon, 3d ed. 1863), and Lightfoot (Colossians and Philemon, 7th ed. 1884).

Philemon and Baucis, according to a classic myth, finely poetised by Ovid in his Metamorphoses, were a married pair, remarkable for their mutual love. Jupiter and Mercury, wandering through Phrygia in human form, were refused hospitality by every one, till this aged pair took them in, washed their feet, and gave them such humble fare as they could provide. On going away, the gods took them with them to a neighbouring mountain, on looking from which they saw their village covered with a flood, but their own cottage changed into a splendid temple. Jupiter permitted them to make any request they chose, but they only asked to be servants of his temple, and that they might die at the same time. When, accordingly, they were seated at the door of the temple, being now of great age, they were changed, Philemon into an oak, and Baucis into a linden.


Phildor, the assumed name of a French family, originally called Danican, which has produced several distinguished musicians, and a composer, François André (born at Dreux in 1726, died in London, 1785), who was even more famous as an authority on Chess (q.v.). See Allen's Life of Phidilor (Philb. 1864).
Philip of Macedon, the father of Alexander the Great, was born at Pella in 382 B.C. He was the youngest son of Amyntas II. and Eurydice, and spent part of his early life as a hostage at Thebes. The assassination of his eldest brother, Alexas, in 359 B.C., made him heir to his throne. His second brother, Perdiccas III., in battle (369 B.C.), made him guardian to his nephew Amyntas, still an infant; but in a few months Philip made himself king, the rights of Amyntas being set aside. Dangers soon beset him from without and from within. He was young and inexperienced, and soon disappeared before the decision, the energy, and the wise policy of the young king. In the brief space of a year he had secured the safety of his kingdom, and had gained for himself a dreaded name. Henceforward his policy was one of aggression. The Greek towns on the coast of Macedonia were the first objects of attack. In Thrace he captured the small town of Crenides, which under its new name, Philippi, soon acquired great wealth and fame. The surrounding district was rich in gold-mines, which proved a source of great revenue to Philip for the rest of his life. He next turned his attention to the means of paying his armies, and of bribing traitorous Greeks to open the gates of many cities. After a few years of comparative leisure he captured Methone (at the siege of which he lost an eye); next year he entered Thessaly, forced the Pass of Thermopylae, which, however, he did not attempt to force, as it was strongly guarded by the Athenians. He therefore directed his arms against the Thracians. After capturing all the towns of Chalcidice—the last of which was the important Thasus—Philip, in 356 B.C., joined himself to the king of the Thracians, and next year with the Athenians, who had been at war with him in defence of their allies the Olynthians. It was this siege of Olynthus by Philip which called forth the famous Olynthian orations of Demosthenes. Philip was now regarded by the Thessalians as their conqueror. His next step was to secure a footing in the Peloponnesus, by expelling the cause of the Argives, Messenians, and others against the Spartans. In 339 B.C. the Amphictyonic Council declared war against the Locrions of Phocis, domestic war with Phocis and his relations in Thrace, and next year Philip captured Phocis, destroyed its cities, and sent as colonists to Thrace many of the inhabitants (346 B.C.); and he was appointed, jointly with the Thebans and Thessalians, king of Thessaly. Philip's next act was to guard against war with Persia. He now made war on the Persian king, chose Philip as leader of their armies. Preparations were in progress for this great expedition when he was suddenly cut off by the hand of the assassin Pausanias, at a festival to the god at Gaugamela, and the terms of his marriage with Dorothea of Ephesus (336 B.C.). Philip was a man given to self-indulgence and sensuality; he was faithless in the observance of treaty obligations, and inscrupulous as to the means by which he gained his ends; but of his energy, acuteness, and eloquence it is impossible to speak too highly. He was at the same time a lover of learning and a liberal patron of learned men. See works cited at Greece and Demosthenes.

Philip II., better known as Philip-Augustus, king of France, was the son of Louis VII. and Alix of Champagne, and was born in August 1163. He was crowned joint-king in 1179, during the lifetime of his father, succeeded him in 1180, and proved a great and able monarch of the Capet dynasty, while he confirmed his hold of the throne by marriage with Isabella of Hainault, the last direct descendant of the Carolingians. His first war, made upon the Count of Flanders, gave him the county of Vermandois and the city of Lille. He invaded Italy, and, by his marriage with Berta of Meissen, despoiled the Jews, and reduced the rebellions Duke of Burgundy to submission. He supported the sons of Henry II. of England in their rebellions against their father, and gained Berri by cession in 1180. On the accession of Richard to the throne Philip and he set out together on the third crusade, but they quarrelled while wintering in Sicily. After staying but three months in Syria he returned to France, having taken a solemn oath not to molest Richard's dominions; but no sooner had he returned than he made a bargain with the faithless edward the Confessor of England to share the kingdom. The fiery Richard's sudden return occasioned an exhausting war, which was closed through the mediation of Pope Innocent early in 1190. Richard died within two months after; but Philip did not hasten an end, on account of the rival claims of John and his nephew Arthur of Brittany to the French heritage of King Richard, which consisted chiefly of Anjou, Maine, and Touraine. Philip embraced the cause of Arthur, but was for a while fully occupied by his quarrel with the pope. He had put away his second wife, Ingeborg of Denmark, in order to marry the beautiful Agnes of Meier, but the terror of the thunder of the Vatican forced him to replace Ingeborg upon his throne. The murder of Arthur again gave him the excuse he sought. Richard's great fortress of Chateau Gaillard fell early in 1204, and Philip passed in triumph over Normandy. Before the end of that year he had added to his dominions Normandy, Maine, Anjou, and Touraine, with part of Poitou, as well as the over-lordship of Brittany, with a fief of Normandy. Philip took no active part in the wars of the English against the French, and devoted himself to consolidating his dominions. The great victory of Bouvines (20th August 1214) over the Flemish, the English, and the Emperor Otto established his throne securely, and the rest of his reign was devoted to enlarging his empire, administrating justice and to the building and fortifying of the city of Paris. Notre Dame and the great court of peers remained last monuments of this great king's administration. He died at Monts, July 14, 1223.

See works by Capetique (3d ed. 2 vols, Paris, 1842), Mazarran (Lille, 1878), and Davidson (Stuttgart, 1888).

Philip IV., surnamed Le Bel or 'the Fair,' king of France, the son of Philip III., the Rash, and Isabella of Aragon, was born at Fontainebleau in 1298, and succeeded his father in 1285. By his marriage with Queen Johanna of Navarre in 1254, he obtained Navarre, Champagne, and Brie. He overran Flanders, but a Flemish revolt broke out at Bruges, and at Courtrai on the Day of Spurs the flower of the French chivalry went down in thousands before the sturdy burghers. The great event of his reign was the marriage of his daughter Marie to Boniface VIII., which grew out of his attempt to levy taxes from the clergy. By the bull Clerici laicos in 1296 Boniface forbade the clergy to pay taxes, and to this Philip replied by forbidding the expenditure of money or valuables, thus cutting off a main supply of naval revenue. A temporary reconciliation in 1297 was ended by a fresh outbreak of the quarrel in 1300. Philip flung
the papal legate into prison, and summoned the three Estates of France, clergy, nobles, and burghers. The last two assured him of their support even in case of excommunication and interdict. Boniface replied with the celebrated bull *Unam Sanctam*. Philip, enraged by the bull, dissolved the Parliament, and the consent of the States-General conferred the property of those prelates who had sided with the pope. Boniface now excommunicated him, and threatened to lay the kingdom under interdict, but the king sent to Rome William de Nogaret and did not seize any prelate in aid of the Colonnas. Though released after a few days by a popular rising, Boniface soon afterwards died. In 1355 Philip obtained the elevation of one of his own creatures to the papal chair as Clement V, and placed him at Avignon, beginning the seventy years' captivity. He expelled the unhappy and reluctant pope to condemn the Templars in 1310, and to decrees the abolition of the order in 1312. In spite of skilful defence, they were condemned and burned by scores (see TEMPLARS), and thus exemplified by God. The grand master, Jacques de Molay, was burned 18th March 1314, and at the stake he summoned Philip to co-operate within a year and a day, and the pope within forty days, before the judgment-seat of God; strange to say, both pope and king died within the latter term of containment. November 29, 1314. Philip during his whole reign steadily strove for the suppression of feudalism and the introduction of the Roman law; but while thus increasing the power of the crown, and also that of the third estate, he converted royalty, which was formerly protecting, kind, and paternal, to the mass of the people, into a hard, avaricious, and pitiless task-master. Under him the taxes were greatly increased, the Jews persecuted, and their property confiscated; and, when these means were insufficient to satisfy his avarice, he caused the images 'greatly deformed.'

**Philip VI.** of Valois, king of France, was the son of Charles of Valois, younger brother of Philip IV., and succeeded to the regency of France on the death of Charles IV. The proclamation of a king was deferred on account of the pregnancy of Charles IV.'s widow; but on her giving birth to a daughter, the deceased child was beheaded, and the king at Rheims (May 29, 1328). His right to the throne was denied by Edward III. of England, the grandson of Philip IV., who declared that females, though excluded by the Salic law, could transmit their rights to their children, and therefore insisted upon the superiority of his own claim. Philip, however, was not only already crowned king, but he had the support of the people. His reign commenced gloriously; for, marching into Flanders to support the count against his rebellious subjects, he encounteredPhilip, the prince of Constance by vanquishing the Flemings at Cassel (August 23, 1328). He was obliged to give up Navarre (q.v.), as the Salic law of succession did not apply to it, but he retained Champagne and Brie, paying for them a considerable annual stipend. The hundred years' war with England began in 1337 both in Gienne and in Flanders, but was carried on languidly for several years, the only prominent incident being the destruction of the French fleet off Shys (June 24, 1340). Philip was a bad and faithless man, and his grasping extortion well-nigh exhausted the wealth of the country. Yet, in the midst of his pleasures and for new wars had constantly to be provided by some new tax or fresh confiscation. In 1346 Edward III. landed in Normandy, ravaged the whole country to the environs of Paris, and totally defeated Philip at Crécy. A truce was then concluded, but the devoted kingdom had no sooner been released from war than death threatened in the yet more terrible form of the 'Black Death.' Philip received Dauphine in gift in 1349, purchased Majorca from its unfortunate king, and died August 22, 1350, neither loved nor respected.

**Philip II.** king of Spain, the only son of the Emperor Charles V. and Maria of Aragon, was born at Valladolid, 21st May 1527. He was brought up in Spain, and carefully educated for his destiny, but grew up distrustful and reserved; cold and austere, without being virtuous; haughty and bigoted, yet without real respect for honour or religion. He eloped in 1554 he married the ill-fated Don Carlos. In 1548 he went to join his father at Brussels, and made a decidedly unfavourable impression upon his future subjects. Three years later he returned to Spain, and in 1554 he made a marriage of policy with Mary Tudor, Queen of England. During his fourteen months' stay in England he laboured hard but unsuccessfully at the unremunerative task of ingratiating himself with his wife's subjects. His failure, together with the vexations jealousy of a wife who was far from chaste, as well as the death of his only forty, and even all male heir, prompted him to leave England and return to Brussels (September 1555). In the next half-year he became by the abdication of his father the most powerful prince in Europe, having under his sway Spain, the Two Sicilies, the Marian, the Low Countries, Franche Comté, Lorraine, and the Duchy of Savoy, with the best disciplined and officered army of the age. The treasury alone was deficient, having been drained by the enormous expenditure of his father's wars. The first danger he had to face was a league formed between Henry II. of France and the Emperor Charles V. and Philip the Second of Spain, his Italian dominions. Alva soon overran the territories of the pope, while Philip's army under Philip of Savoy defeated the French at St Quentin (August 10, 1557) and Gravelines (July 13, 1558). These reverses forced Henry II. to agree to terms of peace at Cateau Cambreins (April 2, 1559). In January 1558 the French had captured Calais, and Mary Tudor's death followed eleven months later. Her husband, after an unsuccessful attempt to obtain the hand of Queen Elizabeth, married Isabella of France (June 24, 1558) and returned to Spain, where he lived the rest of his life.

The main object of his domestic policy was to concentrate all power in himself, and to this end he laboured to destroy everything resembling free institutions in any of his dominions. He estima-

### Philip VI. of Spain

**Philip II. of Spain**

- Born: 21st May 1527
- Father: Don Carlos
- Geographic areas: Spain, Two Sicilies, Marian, Low Countries, Franche Comté, Lorraine, Duchy of Savoy
- Married: Mary Tudor, Queen of England
- Reign: 1554-1555
- Death: 10th August 1555

- **Role**: Major military and political influence during his reign.
- **Policy**: Emphasized centralized power and religious conformity.
- **Legacy**: Under his rule, the Habsburgs expanded their territories.

**Philip II. of France**

- Born: 29th May 1324
- Father: Philip V.
- Geographic areas: France, Champagne, Brie
- Reign: 1328-1350
- Death: 22nd August 1350

- **Role**: Known for his role in the Hundred Years' War and his capture of Calais.
- **Policy**: Focused on internal peace and the suppression of feudalism.
- **Legacy**: Reign marked by the Hundred Years' War and the weakening of the French monarchy.
The one great triumph of his reign was the famous naval victory of Lepanto (September 17, 1571), won by his half-brother, Don John of Austria, over the Turks off of Dalmatia. Spain was now far from having become extinct, Philip laid claim to the throne, and despatched Alva to occupy the kingdom. But his attempt to conquer England recoiled upon himself in hopeless disaster, as the ships of the great Armada were swept to destruction by tempests and the contemptible value of the English seamen. His intrigues against Henry of Navarre were foiled by his antagonist's courage, aided by the death (1592) of his own general Alexander Farnese and Henry's politic change of his religion. The stubborn resistance of the Netherlands and the exasperating ravages of the English cruisers on the Spanish Main, added to financial distress at home, embittered the last years of Philip, and he died of a lingering and peculiarly bathsome disease, in the Escorial at Madrid, on 13th September 1598, under the shadow of that failure which had followed all his greatest undertakings. Philip II. possessed great abilities, but little political wisdom, and he engaged in so many vast enterprises at once as to overtask his resources without leading to any profitable result. A great love and fear of war, and jealous in temper, he persecuted all heretics through the Inquisition with relentless cruelty, and at the same time dealt a fatal blow to Spain by crushing that ancient, proud, and chivalrous spirit which had been the secret of its strength, as well as the commerce of the country, by oppressive exactions and by a bitter persecution of the industrious Moriscos. There is hardly a more unlovable figure in history than this sullen and solitary bigot whom historians with unusual unanimity have united to condemn.

See the articles ALVA, THE DUKES OF ANJOU, CHARLES V., CARLOMART, HOLLAND, AND SPAIN; THE HISTORIES OF FRESCOET, MOLEY, AND FRIENTRE; Mignet's Antonio Perez et Philippe II. (5th ed. 1881); Fernandez's Histoire de Philippe II. (3d ed. 4 vols. 1887); Gachard's two books on Don Carlos, and his editions of the correspondence of Philip (1848-89). The many good points of Philip's character are brought out in Froude's Spanish Story of the Armada (1892) and Martin Hume's monograph on Philip (1897).

Philip V., king of Spain, and the founder of the Bourbon dynasty in that country, was the second son of Philip IV. (who was Louis XIV. and Maria Theresa of Spain) of France, and was born at Versailles, December 19, 1683. In 1700 Philip, then Duke of Anjou, was bequeathed the crown of Spain by Charles II. His grandfather, Louis XIV., as he left him to take possession of the throne, uttered the famous phrase, 'Mon fils, il n'y a plus de Pyrenees.' He entered Madrid in February 1701, and after a long and varying struggle against his rival, the Archduke Charles, was left in possession of his throne by the peace of Utrecht (1713). Next year died the queen, Maria Luisa, daughter of Victor Amadeus, Duke of Savoy, whom Philip had married in 1702; and soon after he married Elizabeth Farnese of Parma, 'the termagant,' in Carlyle's phrase, who embalmed the pride of Europe for thirty years. By her he fathered a son, who was united by the amiable and weak-minded king to Alberoni. Philip was obliged by the Quadruple Alliance to dismiss his daring and ambitious minister at the close of 1718. He abdicated in favour of his son, Don Louis in 1724, but renewed the crown on the death of his half-brother in 1731. The ambitious queen's dearest wish was to drive the Hapsburgs out of Italy in the interests of her sons by a former marriage, but all her efforts succeeded only in securing the Two Sicilies for Don Carlos. Spain joined the coalition against Maria Theresa, and her younger son Don Philip was at first successful in conquering the Milanese; but as soon as the Silesian war was closed by the treaty of Dresden the Austrian queen poured her troops into Italy and drove out the Spaniards. At the crisis Philip, who had been for years sunk in a state of mental stupor, died at Madrid, July 9, 1746. See ALBERONI, Succession Wars, and Spain; and Baadrllari's 'Henry the Fourth, and the Cour de France, 1700-17 (2 vols. 1890-91).

Philip, surnamed of the Wampaug tribe of Indians, was the second son of Massassquat, who for nearly forty years had been the first and staunchest ally of the Pilgrim settlers of Plymouth, and had obtained English names for his two sons. In 1661 Philip succeeded his brother, and formally renewed the treaties of 1644 and 1646. By 1671, however, goaded by the encroachments of the whites, he had formed a confederation of tribes aggregating nearly 10,000 warriors; and in 1675 what is known as King Philip's War broke out. On the Indian side it was a war of surprises and massacres among the towns, which were swept by 600 colonists. In December 1675 Governor Winslow and a force of 1000 men burned the great fort of the Narragansets, swept 600 warriors, and massacred 1000 women and children. In the spring the Indians retaliated for a time, but their numbers steadily diminished after several trials of force, and within five years the confederation; others, littiseral to neutral, declared against them. In the early summer Philip's squaw and little son were captured, and sold as slaves for the West Indies; and on 12th August 1676, at midnight, he and his remaining followers were surprised by Captain Benjamin Church. Philip was slain, and his head cut off. Afterwards his body was drawn and quartered, and the head was exposed on a gibbet at Plymouth for twenty years. Church wrote an Entertaining History of King Philip's War (1715); a new edition of it was published by S. G. Drake, Boston, 1825; see also Washington Irving's Sketch-book.

Philip the Bold (Philippe le Hardi), the founder of the second and last ducal House of Burgundy, was the fourth son of John the Good, king of France, and his wife Constance of Luxembourg, and was born January 15, 1342. He was present at the battle of Poitiers (1356), and with his heroic courage saved his father's life to save his father's, as earned him the epithet of le Hardi, or the 'Bold.' He shared his father's captivity in England, and on returning to France in 1360 received in reward of his bravery the duchy of Touraine, and in the death of his father, the duchy of Burgundy, which he divided in 1369. In 1367 he commissioned with success against the English, and in 1380 he helped to suppress the sedition of the Flemish towns against their count, his father-in-law. But the citizens of some of the populous places, especially Ghent, were possessed with such a fever of independence that they were only brought back to their allegiance after the bloody defeat of Rosbeek (November 27, 1382), when 26,000 Flemings were left on the field. Flanders, the county of Burgundy, Artois, Béthu, and Nevers fell, and he by the defeat of the French at 1384, and his firm and wise government quickly won the affection and esteem of his new subjects. He encouraged judiciously arts, manufactures, and commerce, and his territory—a kingdom in extent —was one of the best governed in Europe. During the minority and subsequent infirmity of his
nephew, Charles VI, of France, he was obliged to take the helm of affairs, and prepare the state from internal condition within and the attacks of the English without. He died April 27, 1404.

**Philip the Good** (Philippe le Bon), Duke of Burgundy, the son of Jean 'Sans-pear' by Margaret of Bavaria, and grandson of Philip the Bold, was born at Dijon, the capital of the duchy, June 13, 1363, and, on the assassination of his father on the bridge of Montreueu at the instigation of the dauphin (afterwards Charles VII.), succeeded to the duchy of Burgundy. Bent on avenging the murder of his father, he entered into an offensive and defensive alliance with Henry V. of England at Armstrong in 1419, at the same time insinuating him as the rightful regent of France, and heir to the throne after Charles VI.'s death. This agreement, which disregarded the Salic law, was sanctioned by the king, parliament, university, and States-general of France in the treaty of Troyes (1420), but the dauphin declined to resign his rights, and took to arms; he was, however, defeated at Crevant (1423) and Verneuil (1424), and driven beyond the Loire. Some disputes with the English prompted Philip to conclude a treaty with the king of France in 1429. However, the English, by ceding to him the provinice of Champagne, and paying him a large sum of money, gained him back to their side. At this time, by falling heir to Brabant, Holland, Zealand, and the rest of the Low Countries, he was at the head of the most flourishing and powerful realm in western Europe; but though much more powerful than his predecessor, the king of France, he preferred to continue in nominal subjection. Smarting under some fresh insults of the English viceroy, and strongly urged moreover by the pope, he made a final peace (1435) with Charles, who gladly accepted it even on the hard conditions which the French proposed. The English, in revenge, committed great havoc among the merchant navies of Flanders, which irritated Philip to such an extent that he declared war against them, and, in conjunction with the king of France, gradually expelled them from their French possessions. The imposition of taxes, which were necessarily heavy, excited rebellion, headed, as usual, by the citizens of Ghent, but the duke inflicted upon them a terrible defeat (July 1434), though he went over a victory bought with the blood of 20,000 of his subjects. The latter part of his reign was filled with troubles caused by the quarrels between Charles VII. and his son, the Dauphin Louis (afterwards Louis XI.), who had fled from his father's court, and sought shelter with Philip, although, after ascending the throne, far from showing gratitude, he tried in the most dishonourable manner to injure his benefactor. Philip died at Bruges, July 15, 1467, deeply lamented by his subjects. Under him Burgundy was the most wealthy, prosperous, and tranquil state in Europe; its ruler was the most feared and admired sovereign of his time, and his court far surpassing its monarch those of his contemporaries. Knights and nobles from all parts of Europe flocked to his jousts and tournaments. See Harante's *Histoire des Ducs de Bourgogne de la Maison de Valois*.

**Philliphaugh**, on Yarrow Water, 3 miles WSW. of Selkirk, the property from 1461 till 1847 of the 'Murray' family, on which the 'Murray' bought the ballad. Here, on 13th September 1645, Montrose (q.v.) was defeated by David Leslie, who butchered more than a hundred Irish prisoners. See Craig Brown's *Selkirkshire* (1886).

**Philip Nerl**, St. See Now.

**Phillipville**, a seaport of Algeria, the harbour of Constantine, from which it lies 54 miles NNE. by rail. There is a magnificent harbour (1882) protected by two molea, one 4500 feet long, the other 1310 feet. The town is quite new, having been built since 1835 on the site of the ancient Roucauda. The imports and exports together reach £3,500,000 per annum. Pop. (1872) 10,267; (1891) 15,788.

**Philippi**, a city of Macedonia. It was named after Philip II. of Macedon (359-336 B.C.), who enlarged it because of the gold-mines in its neighbourhood. It is famous on account of the two battles fought in 42 B.C. between Antony and Octavius on the one side and the republicans under Brutus and Cassius on the other, in the second of which the republicans perished. The apostle Paul founded a Christian church here, to which one of his epistles is addressed.

**Philippians**, Epistle to the, the latest of the four letters that claim to have been written by the apostle Paul during his captivity (see **Paul**). The Philippian Church was looked upon with peculiar tenderness and affection by the apostle. It was one of the most fruitful of his churches, and remained, after some disasters, a flourishing church. The external evidence in favour of the genuineness of this epistle is exceptionally strong; it is added to by Polycarp, and enumerated among the Pauline writings both by Marcion and by the writer of the Muratorian canon. The arguments of Baur and others against its genuineness, which turn purely on questions of biblical theology, such as the compatibility of Phil. ii. 6-11 with 1 Cor. xv. 45-49, or of Phil. iii. 21 with the other expressions in these disputed writings, still find some supporters (one of the latest and ablest being Holsten); but they are not regarded as convincing even by Hilgenfeld, Schenk and Weizsäcker, Pfeiderer, and Harnack. There are commentaries on **Philippians** by Baur, F. Weisaetter, Condrinus (Philippien, 3d ed. 1865), Lightfoot (6th ed. 1881), and C. J. Vaughan (1882).

**Philippines**, originally the three orisons of Demosthenes against Philip of Macedon. The name was afterwards applied to Cicero's fourteen orations against the ambitions and dangerous designs of Mark Antony. It is now commonly employed to designate any severe and violent inexacte, whether oral or written.

**Philippine Islands**, a large insular group forming a northern section of the Eastern Archipelago, from which it is separated by the two profound abysses of the Salu (Mindoro) and Celebes Seas, 2000 to 4000 fathoms deep. But these seas are enclosed by the three insular chains of Palawan, with Balabac in the north, Suln in the centre, and Sangaui with Siau in the south, all of which lie in shallow waters, and form a geological connection between the Philippines and the Celebes. The southern, southeastern, and southwestern Philippines and Celebes in the south. The archipelago, which is washed on the east side by the Pacific Ocean (3000 fathoms) and in the north-west by the China Sea (2000 fathoms), lies in 4°-21° N. lat. and 117°-127° E. long., and comprises a vast aggregate of over 2000 islands.
NATIVES OF NUEVA ECÍJA PROVINCE, LUZON, PHILIPPINE ISLANDS.


A NATIVE HOUSE, SAN PALOC, LUZON, PHILIPPINE ISLANDS.

of all sizes, from mere rocks and reefs to the great lands of Luzon and Mindanao. The total area is about 114,300 sq. m.; the areas of the chief islands are about as follows: Luzon, 44,400 sq. m.; Mindanao, 34,000; Palawan (Paragua), 2515; and in the Visayan group, Mindoro, 3,700; Cebu, 2,000; Bohol, 1,617; and Masbate, 1,352. The population is variously estimated at from 7,500,000 to 9,500,000.

The archipelago is disposed nearly due north and south, and is essentially mountainous and volcanic, lying in the direct line of the vast igneous chain which sweeps round from Sumatra and Java through the Lesser Sunda groups and the Moluccas northwards to Formosa and Japan. In the Philippines the first link in this system going southwards is the volcanic islet of Baluyan on the north coast of Luzon; but beyond the remarkable active volcano of Taal (768 feet), near Manila Bay, the chain ramifies into an eastern and a western branch, which traverse the whole of the archipelago, and which are continued northwards by the sub-arc of Sulu and Sangir. The eastern branch develops the lofty cones of Mayon (9000 feet) and Bulusan at the south-eastern extremity of Luzon, while the western branch gives rise to those of Malapinon and Banahao in Negros and Camiguin. The two branches of Mindanao in this island the two branches converge at the head of the Gulf of Davao, where they culminate in Apo (10,400 feet), highest point in the Philippines. These various ranges, which cover nearly the whole surface of the archipelago, leaving room for scarcely any except except about the lower courses of the rivers, consist mainly of very old eruptive rocks, in many places covered by later tertiary, quaternary, and modern secoiria and lavas. The underground forces are still active, and reveal themselves by tremendous eruptions, such as those of Mayon in 1766 and of Davao in 1814, and especially by earthquakes, which are almost continuous, keeping the seismographs of the observatory at Manila in a constant state of vibration.

Manila itself was nearly destroyed by the earthquake of 1863, which was followed by the disastrous conflagration of 1856, and by the fires of 1852, 1870, and 1874, which spread over the whole city.

The navigation of the inland waters is endangered not only by these disturbances, but also by the conflicting currents caused by opposing tidal waves, and by the cyclones, here called typhoons, which range as far south as about 10° N. lat. (see Map at Asia).

Owing to the parallel disposition of the mountain-ranges, space is afforded for the development of several large rivers, such as the Cagayan (Rio Grande), which drains about one-fourth of Luzon, flowing for 229 miles northwards between the Sierra Madre and the North Cordillera east and west; the Agno and Pampanga on the west side of the same island; and in Mindanao the Agusan (Butuan), navigable by large vessels for over 60 miles, and the Rio Grande de Mindanao, which flows from Lake Mayon in the centre of the island first south-west then north-east to Illana Bay in the Celebes Sea. This river is joined by the emissaries of several other lakes, and a characteristic feature of the landscape in most of the islands is the lake-ground in and about the centres of which there are several other lakes, which send their overflow through short coast-streams to all the surrounding waters. The most important and best known of these emissaries in Luzon are the Pasipit, which drains Lake Bom- bong, and the Pasig, which flows from the Laguna de Victoria (Map, page 329); both are supposed to be flooded craters, while others are of marine origin, bays and inlets cut off from the sea by the erupive matter ejected from the neighbouring volcanoes in former geological epochs.

Thanks to the general elevation of the land, and the prevailing sea-breezes, the climate, although moist and hot, is less insalubrious than that of most tropical lands. The fevers are generally of a somewhat mild, intermittent type, and the most dreaded malady is leprosy, dysentery, and anemia; leprosy exists in Luzon, but its ravages are confined to small areas. As elsewhere in the Eastern Archipelago, there are two seasons, a wet and a dry, which are determined by the trade-winds, but with relations to the peculiar configuration of the land, may be said to go on simultaneously. Thus, for the southern and western slopes, the south-west monsoon is the wet, the north-east the dry season, the recurrence of these periods being reversed on the opposite slopes of the same ranges. At Manila, which is exposed to the south-west winds, the rains last from June to November, dry weather for the rest of the year; but this succession is elsewhere constantly modified, especially by the trend and altitude of the mountain-chains. On the other hand, the temperature varies little throughout the year, ranging from about 77° F. in December (the coldest month) to 86° F. in May (the hottest month), while the greatest extremes recorded at the Manila Observatory are not more than 40 degrees (80°—120°). But a great rainfall is the rule, and is caused by the monsoon winds blowing from 70 to 120 inches per annum at Manila, while in parts of Mindanao the average per annum is 142 inches.

The indigenous flora, which is nowhere surpassed in variety and exuberance, indicates a long connection of the Philippines with Indo-Malaysia, and more especially relations with Austro-Malaysia, as seen through Celebes. Thus all the local genera are represented in the Great Sunda Islands and Malay Peninsula, but only very few in the Australasian world; absolutely independent forms are extremely rare, and generally represented only by a single type. Vast spaces are still covered with magnificent prismatic forests containing a great number of dyewoods, fine, hard-grained, medicinal and other useful plants, such as ebony, sapan, tamarind, guingumita, the incorruptible magkono (a myrtaceous), buyan, coconut, pandanus, nipa, and many other tropical trees. The most useful are the fibrous plants, such as the gigantic bejoco, the buri, canegore, and alaca (Manilla hemp). On the plantations are grown several varieties of rice, maize, sugar-cane, cotton, coffee, the cacao, tobacco, and the tobacco of Cuba. Above 6000 feet the forest and alpine floras are almost exclusively Malayan, and nearly identical with those of Borneo and Sumatra.

The native fauna is remarkable for the total absence of many large mammals, such as the tiger, elephant, rhinoceros, bear, tapir, orang-outang, which nevertheless occur in the Sunda Islands. Hence the only dangerous animals are the crocodile, snakes, and some other reptiles. The largest wild mammal is the buffalo, and next to it the gibbon, besides which there are several other primates such as the thick-tailed tamarind, the pithecia, and the money-tailed tamarind. Above 6000 feet the forest and alpine floras are almost exclusively Malaysian, and nearly identical with those of Borneo and Sumatra.

The carnivores are chiefly represented by several species of civet, the insectivora by the porcupine, and bats and squirrels are rare; while the herbivora are few, and the gallinaceous family especially presents some remarkable forms, such as the labugro (Galura bonkicei) and the bullfesigay, noted for its size, courage, and beautiful plumage. An endless variety of birds is abundant, while the fresh and marine waters abound in fishes, turtles, molluscs (including both the pearl and mother-of-pearl oyster), sponges (euplectella and other exquisites varieties).

Of minerals the most widely diffused are coal
and iron; copper, gold, lead, sulphur, cinnabar, quicksilver, alun, Jasper, marble, and fine building stone are found. But the mineral resources are but little developed, and the most prominent among them are the islands of Negros, Mindanao, and several other islands. The intruding Indonesian and Malay peoples now form a considerable portion of the population. The Indonesians (see Malay), estimated at about 200,000, are divided into numerous tribes, confined to Mindaanao; they are mostly 'infeles' (i.e. pagans). The Malays are either 'Indies' (i.e. Roman Catholics) or 'Moros' (i.e. Mohammedans). The chief Islands are the Tagayas of Luzon, about 1,644,000 in number, and the Visayas (lilaysan), in the Visayas group and parts of Palawan and Mindanao, about 2,600,000. The Moros, numbering about 268,000, are chiefly in Palawan and Mindanao. The Malays have intermarried with the Chinese (of whom there are about 40,000 in the archipelago), Indonesians, Negritos; and Arabs, and to an extent with Spaniards and other Europeans. The Tagal and Visayan languages are the most highly developed of the Malayo-Polynesian family, of which they are gradually absorbing all the other dialects current in the archipelago.

Discovered in 1521 by Magellan, who was killed on the islet of Mactan on April 27 of that year, the Philippines were officially annexed to Spain in 1565, and until 1898 remained a part of the Spanish dominion. Spanish rule was oppressive, taxation monstrous, and the tyranny of the religious orders unrestrained, and risings repeatedly took place—as in 1872. The rebellion in 1896 went on until the Spanish-American War began in 1898. The first serious blow in the war was given in Manila harbour (May 1), when the Spanish fleet was totally destroyed by an American squadron under Commodore Dewey, and on August 13 the city capitulated to the American forces. As a result of the war the Philippines were ceded to the United States on a payment of $20,000,000 in November 1898. But the Tagal, under Emilio Aguinaldo, demanded complete independence, and early in September 1898 had formed a revolutionary government, with Malolos as the capital, Aguinaldo being elected president. Though relations continued strained through the remainder of 1898, hostilities did not commence until February 4, 1900. Fighting continued until 1901; but the decisive action was fought, as the Filipinos generally split up into small bands, which were defeated and routed, only to reappear at another time. American commissioners—Admiral Dewey, J. G. Schurman, Charles Denby, and Dean C. Worcester—were in the Philippines during a large part of 1899, collecting information for use in administering the islands, and endeavouring to place before the Filipinos the true view of American sovereignty, in which they were partially successful. Law courts have been opened in Manila, Philippines, andInstances presided over by Philippine citizens, and civil government has been established in places, notably in Negros in 1890. A second commission, charged with administering the islands, landed at Manila June 3, 1900.

The total value of exports in 1896 was $20,175,000, the imports being imported with a value of $8,600,000: abaca (or hemp), $7,500,000; copra, $1,575,000; tobacco, $2,500,000; and cigars, $750,000. The imports included rice, flour, coal, petroleum, &c., to a value of $19,631,250. Owing to the disturbed condition of the islands, commerce has been depressed during the last few years, but the official figures for the first seven months of 1900 placed the exports at $8,350,500; imports, $12,670,430. China and Great Britain ranked re-

spectively first and second in both imports and exports. Manila (q.v.), in Luzon, is the capital, and there are numerous other towns of considerable size. A railroad, 120 miles long, runs NNW. from Manila to Dagusan.

See J. E. Stevens, Yesterdays in the Philippines (1886); D. C. Worcester, The Philippine Islands and their People (1886); G. J. Youngman, The Philippine Islands Round About (1893); W. H. C. B. Wasley, A Visit to the Philippines (1851); F. Jager, Die Philippinen und ihre Bewohner, in Zeit¬

schriften fur Ethnol. (1870), and Reisen (Berlin, 1875); B. J. S. Hungarian, Die Einwohner der Philippinen, Uber die Negritos, and Album of Philippine Types (Dresden, 1878—

85); Senper, Reisen (Wiesbaden, 1870—91); Blumentritt, in 'Petermains Mitteilungen' (1882, &c.; S. Kneefel, in Bull. phil. Soc. Leicestershire, vol. ii. 1886; Rolfe, Journ. Linn. Soc. (vol. xxx. 1887); Montero y Vidal, El Archipel. Filip. (1886), and Historia General de Filip. (1887); and John Foreman, The Philippines and Independe¬

ces (1892).

Philippopolis, capital of Eastern Roumelia (or Southern Bulgaria), on the navigable Maritza, 110 miles by rail W. by N. of Adrianople. It manufactures silk, cotton, tobacco, leather, &c., and prepares and exports ottos of roses (to the value of $25,000). Pop. (1893) 65,023, of whom nearly half are Turks and Greeks, and others than Bulgarians. An outpost of the Macedonian kingdom, it was ruined by the Goths, captured by the Turks (1363), destroyed by an earthquake (1818), burned (1846), and occupied by the Russians (1878).

Philipsburg, a town of Baden on the Rhine's right bank, 16 miles N. of Carlsruhe. Fortified till 1800, it was often besieged. Pop. 4822.

Philips, Ambrose, minor poet, was descended from a Leicestershire family, and born about 1671. He was educated at St John's College, Cambridge, and contributed to the university memorial volumes on the death of Queen Mary. Coming up to Lon¬

don he became intimate with Addison and Steele, did lack work for Tonson, and first gained a reputation by the 'Winter-piece' in the Tatler (No. 12) and the six Pastoral which opened the sixth volume of Tonson's Miscellany (1700), of which the first four volumes had been edited by Dryden. Strangely enough the same volume closed with the Pastoral of the young Pope, whose jealousy was aroused by Tickell's praising Philips and passing over himself, in his paper in the Guardian on Pastoral Poetry from 1690 to 1700 (1703), in which he took a characteristic revenge by a paper in the Guardian (No. 40), in which the worst of the verses of Philips were ironically exalted above the best of his own. His design he disguised with such dexterity that, though Addison discovered it, as Dr Johnson tells us, Steele was deceived, and was afraid of displeasing Pope by publishing his paper. Philips is said to have hung up a rod in Hutton's Coffee-house with which he threatened to chastise Pope on the first occasion. Pope nourished his anger against him, and all the more after his own immortal Pastoral was published to whose circle Philips belonged, and did not forget him in the Dunciad. Philips supported the government in the columns of the Free-thinker, and was rewarded by being made secretary to Archbishop Boulter in Ireland. Later he sat for Armagh, acted as secretary to the Good Queen, and judge of the Supreme Court, and after his patron Boulter's death returned to London, and died in 1749. Of his plays, The Distressed Mother (1712)—an adaptation from Racine's Andromache—was warmly praised in the Spectator; The Briton and the Humphry, Duke of Gloucester last enjoyed during the few years of whose circle Philips belonged, and their Pastoral is vigorous and easy yet graceful verse, but lack the charm that belongs to Gay, whose Shepherd's Week was really written at Pope's
instigation to take Phillips off. Some of his odes, addressed to children, and written with infantine simplicity of diction, earned him from Henry Carey the lasting nickname of ‘Namby-Pamby.’


**Phylis or Phyllis, Edward**, the elder of the two nephews brought up and educated by Master Anne Lister’s widow, Susanna E. Phillips held a government office in Chancery, and died in 1631, leaving two sons to Milton’s care. Edward Phillips was born in 1630, and became a student of Magdalen College, Oxford, but left in 1631 without taking a degree. In 1660 he was tutor to the son of John Evelyn of Surrey, and then moved to Essex. He is mentioned in Evelyn’s Diary as ‘not at all infected by Milton’s principles,’ yet certainly he entertained a great respect and admiration for his uncle, and not only extolled Milton in his *Theatrwm Postharmm* as ‘the exactest of heroic poetaries, ’ who hath revived the majesty and true decorum of Heroic Poesy and Tragedy,’ but has left us a valuable though short and fragmentary Life of the poet. This was originally prefixed (1694) to a translation of Milton’s *Letters of State*, but was omitted in the edition of 1695 of *Phylis* and *J. Phillips* (1815, pp. 350–353), and is, as Johnson says, ‘the only authentic account of Milton’s domestic manners.’ Of his numerous works may be mentioned a complete edition (the first) of the *Poems of Drummond of Hawthornden* (1655); *New World of English Words* (1658); a kind of dictionary, which went through several editions; the *Continuation of Baker’s Chronicle of the Kings of England* (1655); *Theatrwm Postharmm*, or a Complete Collection of the Poets (1673); the *Tractatus de Curtum DHymnatico* (1661); *Theatrwm Postharmm* in the 18th edition of *Milton* (1700); the *Liber ab Heracleo Incertum de Lingua Latina* (1652). Milton, says Aubrey, made his nephews songsters, and sang from the time they were with him, and verses by both are found in *Ages and Dialogues for One, Two, and Three Voices*, by Henry Lawes (1663). Edward is supposed to have died shortly after the publication (1694) of the *Letters of State*.

**Phylis, John**, Milton’s younger nephew and more peculiar charge, born in 1631, was, like his brother Edward, educated by his uncle, and frequently acted as his amanuensis. It may be supposed that Milton had formed a high opinion of his literary capability, since he entrusted to John rather than to John the writing of the *Revelations of the Kingdom of Heaven* and *Apologia pro Rege et Populo Anglicana* (1652), himself correcting it with the utmost care. But if John was Edward’s superior in ability, he was greatly his inferior in character, and persistently displayed an unnatural animosity to his uncle and benefactor. His next work was *A Satyr against Hypocrisses* (1655), a bitter anti-Puritan poem and attack on Cromwell, written with considerable talent, but in a strain of coarse buffoonery. Somewhat in the style of Chaucer, he describes a Sunday in Cromwell’s time, a christening; and a Wednesday last with the extravagant supper at night. This production was frequently reprinted, and must have caused Milton no small disappointment and annoyance. In 1660 John amused himself and the world with his *Mantellion or the Prophetic Egyptian*; a book which, though written with great care, was however, extremely successful; he was also a most industrious translator, and in little more than a year (1677) published three large folio translations, *Almahide*, from the French of Madame de Senécdé, on which was founded Dryden’s tragedy, *The Conquest of Granada*, the *Calvary*; and *Tavernier’s Voyages*. Phillips (or Phillips) wrote many scurrilous pamphlets, and died in 1706.

**Phylis, John**, described on the monument in Westminster Abbey erected by Sir Simon Harcourt to his memory as a second Milton. He was the author of three very popular poems, *The Splendid Shilling*, a burlesque of Milton’s manner; *Cider*, an imitation of Virgil; and *Blenheim*, a Tory celebration of Marlborough’s great victory. He was born in 1676, but, curiously enough, was registered at Winchester as five years, and at Christ Church, Oxford, as six years younger than he really was. He died in 1708, and was buried in the cathedral at Hereford.

**Phylis, Katherine**, ‘the matchless Orinda,’ was born the daughter of a respected citizen of London, and a Puritan merchant, on New-year’s Day 1651. A precocious child, she early became strongly royalist in feeling, and in her seventeenth year she married a worthy Welsh gentleman, James Phillips of Cardigan Priory. Her earliest poem was an address to Henry Vaughan, Poet Laureate, in the appearance of his *Dioi Sceaus* (1651). About the same time she seems to have assumed her melodious non-de-plume of Orinda, having formed among her neighbours of either sex a Society of Friendship, the members of which must needs be re-baptised—the ladies as Virginius, Rosamund, Salvea, and the gentlemen as Palamon, Silvander, Antenor (her own husband), and Polarchus (Sir Charles Cotterel, her greatest friend, her forty-eight letters to whom were published in 1705). Orinda is our earliest sentimental writer, and she has tears at will for the marriages and the other sufferings of her women, which she represents as outrages on the sufficiency of friendship. Yet she was a worthy woman and good wife, despite her overstrained sentimentality, and deserved the honour of a dedication from Jeremy Taylor (Dialogue on the Nature, Offices, and Passions of Friendship) and from Sir John Carew in *D_ACTIV* (1662), and here Roger, Earl of Orrery, and the rest gave her a flattering reception. On a visit to London she caught smallpox, and died at thirty-three, June 22, 1684. At Dublin she translated Cornelle’s *Poetacria*, in the last year of the greatest part of his *Horace*. Her poems were surreptitiously printed at London in 1663, but an authoritative edition was issued in 1667. The matchless Orinda’s poetry has long since faded into forgetfulness, despite the chorus of contemporary jurors. From Cowley and even Pope not Keats found her poems in 1817 while writing *Endymion*, and in a letter to Reynolds speaks of them as showing ‘a most delicate fancy of the Fletcher kind.’ Mr Gosse conjectures the scarce volume of *Female Poems* (1679) written by Epiphelia to have been the work of Orinda’s only daughter, Joan (born about 1654), who married Mr Wogan of Pembroke, in 1679. See the admirable essay by Mr Edmund Gosse in *Eighteenth Century Studies* (2d ed. 1885).

**Phyliphon**, a market-town of King’s County, Ireland, 8 miles E. of Tullamore and 49 miles W. by S. of O. of Lough Allen, and takes its name from Queen Mary’s consort, Philip of Spain. *Pop. 829.*

**Philistines** (Heb. Polelatim; Gr. alollphoi, ‘strangers’), a people mentioned in the Bible as being in frequent contact with the Jews, and who lived on the coast of the Mediterranean, to the south-west of Judea, from Ekron towards the Ionian coast; in modern times they are divided into the tribes of Dan, Simeon, and Judah. Our information about the origin of the Philistines is extremely obscure. The genealogical table in Genesis (x. 14) counts them among the Egyptian colonies (the *Casalhum, out of whom came the Philistines*); but according to II Esdras, vi. 4, and I Maccabees, ii. 123, they came from Caphtor—formerly, from mere resemblance of the word, identified
with Cappadocia. Others have, groundlessly, derived them from the Pelasgians. Of late the tendency is to believe that the Phœnicians, who were undoubtedly immigrants, came from Crete, the collocation of Cheroheites (Cretans) and Peleleites (2 Sam. viii. and xiv.) favouring this view. But they seem to have become thoroughly Semiticised in speech, their language being undistinguishable from that of their Hittite neighbours. Their Baal-cult and Dagon (q.v.) are apparently Semitic.

It is doubtful if Aimebelech, king of Gerar (Gen. xxii., xxvi.), was king of this people or merely of the country afterwards Philistia; more probably the expulsions of the Philistines (Judg. xiii.) justly ascribed before the new invaders, marks their first appearance as aggressive enemies. They were subject to five princes, who ruled over the provinces of Gaza, Askelod, Askalon, Gath, and Ekron. They were so powerful at the time of Eli that they carried away the Ark. Samuel's rule was terminated by the battle of Mizpah. Saul was constantly engaged in warding off their new encroachments, and at Gilboa he and his sons fell in a disastrous battle against them. David succeeded in routing them repeatedly; and under Solomon their country seems to have been all but incorporated in the Jewish empire. The internal troubles of Judah emboldened the Philistines once more to open resistance; but Hezekiah subdued their country with the aid of the Egyptians. The Assyrians afterwards took Ashdod; and in the time of the Maccabees the Philistines were Syrian subjects; by the time of Herod the name of the country had long been lost in that of Palestine. A civilised, agricultural, commercial, and warlike nation, they traded largely, and their wares seem to have been much sought after.

See also the various histories of the Jezreelites cited at Jezra; Schrader's Keilschriftchronik (2d ed. 1853); Wright's Comp. Gram. of the Semitic Languages (1860).—German students call those who have ceased to be students, as well as non-students, tradesmen, &c., Philister or Philistines; hence the further term of 'Philistine,' 'narrow-minded,' in which application the term has come to be used in Britain, especially through Mr. Matthew Arnold's influence.

Philirofe. Sir Robert Joseph, born 5th November, 1795, and educated at Oxford, was, after serving in the Board of Control, had a brilliant career at the bar. He sat in parliament as a Whig from 1833 to 1857; and held in succession the offices of Advocate-general (1842, when he was knighted), Judge Advocate-general (1871), judge of the Arches Court (1867-75) and of the High Court of Admiralty (1867-83). Made a baronet in 1881, he died 4th February 1885. His most important works are his Commentaries upon International Law (4 vols. 1834-61; 3d ed. 1879), and his Ecclesiastical Law of the Church of England (2 vols. 1873-87).

Philly. John, R.A., was born, an old soldier's son, at Aberdeen on 19th April 1817. He was apprenticed to a painter and glazier, but in 1836 was sent by Lord Panmure to London, where he was ere long admitted to the schools of the Royal Academy. In 1839 he began to exhibit in the Academy Exhibition. Most of his early works were of Scotch character, such as a 'Scottish Fair,' and 'Baptism in Scotland.' In 1851 he went to Spain in search of health. On his return he became noted as a painter of the habits and emotions of the Spanish people, and was known as 'Spanish Phillips.' He is among the Gypsies at Seville.' His pictures for 1854-55, 'A Letter Writer of Seville' and 'El Paseo,' were purchased by the Queen. In 1857 he became A.R.A., in 1859 R.A. 'The Marriage of the Princec Royal' (1860) was a success, as was also the House of Commons, containing upwards of thirty portraits of the leading Tory set of both sides of the House. But his most triumphs were in Spanish subjects, such as 'La Gloria' (1864) and 'El Cigarillo' (1864). He twice again visited Spain, was in Italy in 1866, and died in London, 27th February 1867. His 'Early Career of Murillo' sold in 1865 to Mr. Guinness, who, as a political democrat, and his light effects were broad and strong.

Philips, See Philip, Halliwell-Philips.

Philips, Wendell, abolitionist, was born 20th November 1811, at Boston, Massachusetts, the son of the first mayor of the city (1822). He graduated at Harvard with Motley in 1831, studied law, and was called to the bar in 1834. Before clients came he had been drawn away from his profession to the real work of his life. A timely and important speech in Faneuil Hall in 1837 made him at once the principal orator of the anti-slavery party; and henceforth, until the president's proclamation of It January 1863, he was Garrison's loyal and valued ally, his lectures and addresses doing more for their cause than can well be estimated. He also championed the cause of temperance, and that of women, and advocated the rights of the Indians. In 1870 he was nominated for governor of the Prohibition party. He died 2d February 1884. His speeches and letters were collected in 1863 (new ed. 1884); and there is a Life by G. L. Austin (Boston, 1888).

Philipsburg, a town of New Jersey, on the Delaware River (crossed by two railroad bridges), opposite Easton, at the western terminus of the Morris Canal, and 85 miles south of New York by rail. It contains a rolling-mill and several foundries, boiler-and locomotive works, &c. Pop. (1900) 10,052.

Philoctetes, a famous archer, the friend and armour-bearer of Hercules, who bequeathed him his bow and poisoned arrows. As one of the suitors of Helen, he led seven ships against Troy; but, being bitten in the foot by a snake (or, according to one story, wounded by his own arrows), he fell ill. As his wound gave forth an undearable stench, the Greeks left him on the island of Lemnos, where for ten years he spent a miserable life. He could neither eat nor be taken without the arrows of Hercules, so Ulysses and Neoptolemus were despatched to bring Philoctetes to the Greek camp; where, healed by Asclepius or his sons, the restored hero slew Paris, and helped powerfully in the taking of Troy. After the war he settled in Italy. A play of Sophocles is named from him.

Philo Byblus. See PHILAE, p. 133.

Philolus, the Philosopher, was born at Alexandria, most probably about 20-10 B.C. Belonging to a wealthy family—his brother, according to Josephus, was the alabarch or archbishop Alexander—he received the most liberal education; and such was his zeal for learning that at a very early age he had passed through the ordinary course of Greek studies. Although every one of the different free sciences and arts included in the Enneadokles, he says, attracted him like so many beautiful flowers, he could not withdraw from the study of mathematics, the mistress of them all—Philosophy. Metaphysical investigation was the only thing which, he tells us, could give him anything like satisfaction or pleasure. He was intimately acquainted with Plato, the Greek tragedians, and Homer, and he was both an admirer and a critic of the Styes and the Pythagoreans. With these and especially with Plato his affinities are closest—an old proverb runs: Χρήστες ον Φιλόπολλος Φιλός Πλάτωνι. Yet with all his Greek culture he remained a Jew, holding Jewish philosophy as the highest wisdom.
the divine revelation given to Moses as the source of all true knowledge in religion. He had completely mastered the literature of his nation, but, strange to say, had never read any of the ancient Hebrew scholars. When over fifty years of age he went to Rome as the advocate of his Alexandrian brethren, who had refused to worship Caligula in obedience to the imperial edict. His De Legatione ad Gaium gives the best reason of the difference between the life we know little except what is recorded above, and that to which he once went to Jerusalem. His second mission to Rome, to the Emperor Claudius, on which occasion Eusebius reports that he made the acquaintance of the apostle Peter, is doubtful.

The record of the philosophical system of Philo, however, is most minutely known, and deserves the most careful study on account of the vast influence which it has exercised both on the Jewish and Christian world. To understand his system, it will be necessary to recall to memory the strange mental atmosphere of his day. The Alexandrians had endeavoured to make Judaism palatable to the refined Greeks, by proving it to be identical with the grandest conceptions of their philosophers and poets, and had quite allegorised away its distinctive characteristics. Philo was the first man who, although he was upon the other hand regarded as an allegorising tendency, made a bold and successful stand against a like evaporisation of the revealed religion of his fathers; which, indeed, in many cases had led people to throw off its yoke also outwardly. Himself a most zealous champion of Judaism, he himself says 'I endeavoured to instruct the most zealous of the philosophers who tried to defend their secret or overt apostasy by scoffing at the Law itself, who were 'impatient of their religious institutions, ever on the lookout for matter of censure and complaint against the Law of God, but more especially, for their own words, thoughtlessly urge all manner of objections.' He cannot understand how Jews, 'destined by divine authority to be the priests and prophets for all mankind,' could be found so utterly blind to the fact that that which is the position only of a few of the most sublime and excellent people, viz. the knowledge of the Highest—had by law and custom become the inheritance of every individual of their own people; whose real calling, in fact, it was to invoke the blessing of God on mankind, and who, when they offered up sacrifices 'for the people,' brought a sacrifice for the world. He has said that to Philo the divinity of the Jewish law is the basis and test of all true philosophy. Although, like his contemporaries, he holds that the greater part of the Pentateuch, both in its historical and legal portions, may be explained allegorically—nay, goes so far even as to call only the Ten Commandments, the fundamental rules of the Jewish theocracy, direct and immediate revelations, while the other parts of the Book are owing to Moses—he yet holds the latter to be the interpreter specially selected by God, to whose dicta in so far as also divine veneration and strict obedience are due and again, while admitting that many explanations of a metaphysical nature may be given to single passages, yet demands in general that their literal meaning shall not be tampered with. This literal meaning, in a sense to be understood is, the other explanations are mere speculation— exactly as the Midrash and some Church Fathers hold. At the same time it is true that without denying the literal meaning, again and again he permit the interpretation of the law, and is the more divinely, and indeed sometimes he treats the literal meaning as absurd. Only the allegorical method in his hands differed in so far from that of his contemporaries that to him these interpretations—for which he did not disdain sometimes even to use the numbers symbolically, or to derive Hebrew words from Greek roots, and the like—were not a mere play of fancy, in which he could exercise his powers of imagination, but, to a certain extent, a power that with the Deity. He has yet to speak, as combined with the Law. If the former could be shown, somehow or other, to be hinted at in the latter, then only he could be that which his all soul yearned to be—viz. the disciple of both: a Greek, with all the refinement of Greek culture, and a Jew—whom he endeavoured to prove that he even urged the necessity of allegory from the twofold reason of the anthropomorphism current in Scripture and from certain apparent superfluities, repetitions, and the like, which, in a record that emanated from the Deity, must needs have a special meaning of their own which required investigation and a peculiar interpretation. Yet this fanciful method never for one moment interfered with his real object of pointing out how Judaism most plainly and unmistakably was based upon the highest ethical principles.

His writings develop his ideas and his system in the two directions indicated. In that division of his writings principally which treats of the Creation (καταγεννησις) he allows allegory to take the reins out of his hands; in that on the Laws (φαιναμενα), he endeavours to prove that the Mosaic legislation is more and more, and clear, exulting the Mosaic legislation throughout at the expense of every other known to him. In a very few instances only is he induced to find fault, or to alter slightly, by way of allegory, the existing ordinances. His idea of the Law is intended to be in the highest degree philosophical, though its religious significance is never lost sight of. God alone is the real Good, the Perfect, the final cause of all things, which ceaselessly workflow from Himself. Of a second beginning is the primary light, which cannot be seen by itself, but which may be known from its rays that fill the whole world. Being infinite and uncreated, He is not to be compared with any created thing. He has, therefore, no name, and reveals Himself only in designations expressive of this 'inexpressibility,' such as 'the Place' (τος Μεχρικας Μακος), because He comprises all space, and there is nothing anywhere besides Him. He is better than Virtue and Knowledge, better than the Beautiful and the Good (αρετης και γηνις), simpler than the One, more palatable than the Many. He distinguishes no quality, or only negative ones. He is the existing Unity or Existence itself (ο εστος), comprising in the unpronounceable Tetragrammaton. As Creator, God manifests Himself to man, and in this phase of active revelation of God, which is as natural to Him as burning is to the heat, and cold to the snow, may be distinguished two distinct sides or essential properties, the Power and the Grace, to which correspond the two Scripture names of Elohim and Adonai. The Power also gives the laws and punishes the offender; while the Grace is the beneficent, forgiving, merciful quality. Yet, since there is not to be assumed an immediate influence of God upon the world, their respective natures being so different that a point of contact cannot be found, an intermediate class of beings had to be introduced, who could pass through whom He could act in and upon creation—viz. the spiritual world of ideas, which are not only 'Ideas,' or types, in the Platonic sense, but real, active powers (δυναμεις), surrounding God like a number of angels, who are ever ready to serve, who are the servants, who work His will, and by the Greeks are called good demons, by Moses angels. There are very many different degrees of perfection among them. Some are immediate 'serving angels;' others are the souls of the pious, of the prophets, and the people of Israel, who rise higher up to the Deity; others,
again, are the heads and chief representatives of the different nations, such as Israel does not need, since they properly belong to and acknowledge the Everlasting Heir of all Beings Himself. Collectively the Powers are used as equivalent to the nature or essence of God—his ideas or thoughts dominating and informing the universe; yet they are far from being substitutes for God. Zeller maintains that in Philo the universe and the heavens two real existences. Dr. Drummond refuses to admit that Philo imputed personality to the Powers, or that he identified them with the angels. Schürer maintains that we cannot deny definitely the personification of the Θεός or θεών, since Philo conceived of them both as independent hypostases and as immanent determinations of the Divine existence.

The Logos, or Divine Reason, comprises all these intermediate spiritual powers in his own essence. It is the universal idea, the one supreme and all-embracing thought, by which the universe is formed into a certain cosmos—a property of God, and the representative of God in his relation to the created world. As such the Logos is the highest of the angels, the "Beginning," the Name, the Word, the Primordial Angel, the first-born son of God, the second God (the antithesis of the first), the eternal Thought of God. As he expressed Thought of God it has a twofold aspect regarded as the οὐδέρε and the ἱνδος Logos, although this is not formally expressed by Philo. It becomes objective in the harmonies of the created world, and stands distinct from the same Thought when hidden in the silent depths of God, and known only to His omniscience. The Logos formed the world out of chaotic matter, regarded as a mass occupying space, and now considered as the μὴ λεγείν of Plato, again as the θέος of the Stoics. Man is a microcosm, a little Logos, in himself, a creation of the archetypal Logos, through whom he participates in the Deity, or, as Scripture has it, 'he is created in the image of God.' He stands between the higher and lower beings—in the middle of creation. The ethical hierarchy of Stoicism did not extend to the Logos. He is identical with the Mosaic ethics, in which the ideal is most exalted moral perfectibility or sanctity, and man's duties consist in veneration of God, and love and righteousness towards fellow-men. Philo holds firmly the belief in immortality. Eternity is the motionless duration of unalterable being; time but the moving succession of ever-shifting phenomena. Man is immortal by his heavenly nature; but as there are degrees in his divine nature, so there are degrees in his immortality, which only then deserves this name when it has been acquired by the supreme Logos. There is a vast difference between the mere living after death, which is common to all mankind, and the future existence of the perfect ones. Future recompense and punishment are not taken by him in the ordinary sense of the word. Virtue and sin both have their recompense at once; they are "in the soul," which is 'existing,' having finished its course in the sublunar world, carries this consciousness with it in a more intense and exalted manner. Paradise is Oeness with God; there is no hell with bodily punishments for souls without a body, and no heaven for the Stoic system (Christianity). Philo succeeded in proving against Dähne and others that matter, though eternal, is purely passive, and not itself necessarily evil in Philo's teaching. The source of the imperfection is not in the material as opposed to the spiritual, but in the phenomenal as opposed to the eternal. The human ζωή is seen as a school for the present life, and knowledge of that life is tantamount to the bondage of sense, and the loftiest principle of ethics is the utmost possible renunciation of sensuousness. The direct vision of God is possible only for those souls which have been lifted out of themselves and illumined by renunciation and reverence. The world is represented as the complete deliverance from the body beyond the gates of death, when the soul that has freed itself in life from the bondage of sense returns again to its original condition as pure spirit.

Philo's Messianic notions are vague in the extreme. He never even interprets certain scriptural passages alluding to some future Redeemer as referring to the soul. Yet he indicates his belief in a distant time when some hero will arise out of the midst of the nation who will gather all the dispersed together; and these, purified by long punishments, will henceforth form a happy, sinless, most prosperous community, to which all the other nations will be eager to belong. Still the Messianic hope is very obscure, and Dähne's identification of the Logos with the Messiah is indefensible.

We have only been able to indicate, in the slightest of outlines, the principal features of Philo's theology and philosophy, without endeavouring to follow any one of the manifold systematic schemes into which his scattered half-obscure dicta have here and there been pressed. His method of criticism and the main elements of his religious philosophy passed into the Christian church, and exercised a powerful influence over its thinkers. Nor can Philo ever lose his importance in the history of thought as the earliest eclectic religious philosopher, the clearest and best of that class of writers, in which were harmonised the rational and the irrational—the results of speculative thought with the suppositions of a supernatural revelation.

Philo's writings are numerous, and their arrangement presents no small difficulty to the student. Many of his writings are preserved in later compilations (H.E. ii. 18), but the bulk of these have been preserved in the Fathers and early Christian writers, like Eusebius, who quote Philo to an enormous extent. Many detached portions have been preserved in the apocryphal and apocryphal compilations of the earlier Christian Parallelists. The first and very imperfect edition of the Greek text was that published by Tümpelen (Paris, 1582), containing only sixty-three apocryphal works. The best of the Latin is that of Mangy (2 vols. folio, Lond. 1742), but a satisfactory collected edition is still a desideratum, neither that promised by Grossmann so long ago as 1829, nor that for which Tischendorf collected materials, ever having appeared. The Librius de Opificio mundi was edited by Leop. Cohn in 1889 as a specimen of a projected edition. Several writings of Philo preserved only in Armenian have been published in Latin translations by Jo. Bapt. Aurcher (Venice, 1822, 1826); and Greek portions of greater or less extent have been given by Mai, Grossmann, Tischendorf, Cardinal Pirra, and Professor J. Rembel Harris (Cambridge, 1886). The most complete and convenient series of the materials are contained in the hand edition of C. E. Richter (8 vols. Leip. 1828-30) and the Taurinum stereotype edition (8 vols. Leip. 1851-53). See the brief account of each book in Schürer's art. of Philo, Jews, People (2 vol. iv. iii. 1886) in Clark's translation. An important contribution to Philo bibliography is that by L. Masselief (Paris, 1888). There is an Eng. trans. by C. J. Yonge in Bolin's "Eccles. Library." (4 vols. 1854-55).

More than three-fourths of what has come down to us from Philo consists of three chief works on the Pentateuch: The Treasures or Hebrew Wisdom (in Armenian—a short explanation of Genesis and Exodus in question and answer; (2) Νόμων τῆς ἀλλαγούν, a large allegorical commentary on Genesis, in which the history is interpreted as a system of
PHILOLOGY

Armenian), a may to knowledge coni-
and convents Philosophic his Edersheim's liecaiise
and such series Exposition and modern matters was human De
At himself, Mosaic philologer the teach Halle,
gronp Kiance, speech Alexandria
—-—

driana divisions—

talio the

lefiislntion

Scholars

Mu
eose.

hus and

—which

Plato,

the study

of

the

art,

this

the

speak

which

the

the

it

the

of

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the
brought with them the MSS. of Thucydides and of Plato, to be translated by Valla and by Ficinus; and it was in Italy that the first modern philologists laid the foundations of philology, which later became a large school at large by the great houses of the Manucci and the Giunta. But with the exception of Faerno Italy had no great scholar. Yet by its connection with France it produced scholars in northern Europe. Budé was secretary of Louis XII., whose main interests were in Italy; Lamblin visited Rome and Venice before he became the editor of Horace, of Lucretius, and of Cicero; while Muret, though born near Limoges, lived and worked at Rome from 1559 to his death in 1585, and at Rome he lodged for two years the year before his death. Later, during the decline of Italian learning, foremost of European scholars. Italian by descent, but born in France, where he edited his Manuils and wrote his De Emendatione Temporum, the first great work in historical criticism, he was led by his conversion to Protestantism eventually to retire from France to Leyden, where he ended his days, the dictator of the world of letters. Isaac Casaubon, a leader in exegesis, as Scaliger was in criticism, though born at Geneva, was the son of a French Huguenot refugee, and in France he lived during the most part of his life, till like Scaliger he fled south-west into the rising Protestantism of England. Justus Lipsius, the third great scholar of the day, was a Belgian, professor successively at Jena, at Leyden, and at Louvain; he also had travelled in Italy.

Of the members of the older German school the most famous is Erasmus, by birth a Hollander, but the centre of a band of able scholars at Basel, where he spent the last sixteen years of his life, well known in England, and for a short time a professor at Cambridge, a man of vast learning, but not a master in criticism, "the man of letters, the first who had appeared in Europe since the fall of the Roman empire" (Mark Pattison). He lived some three years in Italy, but gained, as he thought, nothing from it. Able scholars were Camerarius, professor at Leipsig, and Grotius of Antwerp, the first great lexicographer of Greek and Latin inscriptions.

For different reasons France and Germany ceased to be the nurseries of scholarship in the 17th century. The reign of Louis XIV. fostered modern rather than ancient literature; and Germany was the scene of furious war. But Scaliger’s influence lived on in Holland, at Leyden, where he died in 1649; Daniel Heinsius and his son Nicolas, Gronow, conspicuous for his skill in appreciating MSS. and Cluver, the first great writer on geography. At the same time Graeae was editing Cicero at Utrecht. Somewhat later in England lived the first of English scholars, Richard Bentley, in frequent correspondence with Dutch scholars, but owing nothing to them, a man whose astounding critical power could not always save him from errors due to his self-confidence. The only other Englishman whose name, like Bentley’s, has steadily grown with time was John Selden, professor of Greek at Cambridge at the end of the 18th century. Distinguished names in the school of Holland in the 18th century are Hemsterhuis and his pupils Ruhnken and Vaelckenae. In Germany we find Ernesti at Leipsig, the editor of Cicero; his scholar, Heyne, the founder of the school of Gottingen; Griesbach, professor of Greek at Cambridge, who was not only in Greek and Latin, but also in Arabic, whose edition of the Greek orators is still in use; Winckelmann, the first great writer on ancient art; Wolf, professor at Halle, best known as the great Homer critic, but whose general power and method almost entitled him to a place in the school of Scaliger and Bentley. Scholars of a later date, whose lives extended far into the 19th century, are Immanuel Bekker, professor at Berlin, editor of Plato, Thucydides, the orators, and Aristophanes; Godfrey Hermann, a scholar of unusual breadth, whose fame rests securely upon his work on Æschylus; Welecker, an outstanding professor of Sanskrit, who only late suffered the loss of H. A. J. Munro of Cambridge, the inquirer of Lachmann’s labour on Lucretius; of Madvig the Dane, a Latin scholar of eminent acuteness; and of Cobet, in whom the critical power of Holland seemed to be renewed again. (An excellent sketch of the last of these men is given in the Süddeutsche Zeitung, March 23, 1864, by Dr. Ulrichs of Würzburg, will be found in the first volume of Iwan Müller’s Handbuch der Klassischen Altertumswissenschaft.)

Speculations on the connection of Greek and Latin—e.g. that Latin was derived from some Greek dialect, and that both, as well as all the other languages of the earth, must be derived from Hebrew—are not wanting in the writings of the older scholars. It was reserved for an Englishman, Sir William Jones, in 1786, to point out that Sanskrit, Zend, Greek, Latin, Gothic, and Celtic belong to the same family; and that the later learned about 1770, born at Mainz in 1791, to become the founder of the special science of comparative philology. In his ‘conjugation-system,’ published at Frankfurt in 1816, he worked out the details of the principle already established by tracing out the history of the verb-forms of the Greek, Latin, Sanskrit, Germanic, and Teutonic as compared with Sanskrit. His monumental work, the Comparative Grammar, appeared at different times between 1833 and 1852. In this he lays down the phonetic laws of the several languages, and traces their grammatical forms back to their common origin in a last Indo-Germanic speech. It is impossible here to describe the development of this work in the hands of the singularly able men who laboured at it in the same generation, such as Jakob Grimm, the founder of the scientific study of the Teutonic languages; Pott, the most learned and voluminous of writers; Benfey, the acute philologist and accomplished Sanskritist. The most successful application of the science to Greek was made somewhat later by Georg Curtius, and to Latin by Corssen, and in France by Michel Breal. The common principle of all these writers was that the newer-changing change in every language is regulated by law; that in each language there is a regular sequence of sound, one passing into the other, not by chance or by the will of any speaker or speakers, but in a definite ascertainable course; and that only by the knowledge of these sequences, commonly but not very wisely termed ‘laws,’ can the science of language exist.

One of the best known of these is the sound-change commonly called ‘Grimm’s Law,’ which states the fact that whenever we find a k, t, or p in Sanskrit, Greek, or Gothic, we get a q, g, or b in English; parent-language, we shall find in English and most other Teutonic languages an h, th, etc.—e.g. sapd-ia (Lat. ‘cord.’) will appear as heart, ‘tres’ as ‘three’, ‘pes’ as ‘foot’; that y, d, b will appear as k, t, p (‘genus’ as ‘kin’, ‘uno’ as ‘two’); and aspirates (sh, dh, dhi, etc.) will be eliminated. ‘Ghans’ = ‘goose’, ‘blaugos’ = ‘beech’.

Further, that a subsequent ‘shifting’ of the same kind, but much less complete, took place many centuries later in Germany itself, and produced there the changes which distinguished the dialects of South Germany (‘High German’) from those of North Germany (‘Low German’), as it is called in Germany itself, ‘Platt-Deutsch’) and from our own English—e.g. ’drei’ from ‘three’, ’zwei’ from ‘two’, &c. Such astounding uniformity of change over so large an area was well calculated
to confirm the belief in the 'reign of law' in language. But that belief was extremely strengthened when in 1852 Karl Verner wrote a paper (published in Kuhn's "Zeitschrift", vol. xxii.), in which he showed that some apparent exceptions to Grimm's Law were really due to the operation of another and wider law (commonly called by his name) dating from very early times. This law, which he called the Teutonic, was derived from the parent-speech; in consequence of which at the present day a west Cumberland dalesman says 'fadder' and 'mudder,' but 'brother,' because in the parent-language (as attested by Sanskrit and Greek) the stress was laid on the last syllable in these words. But, from a reality it tear A here, for, in the Teutonic, though 'father,' in the Indo-German, to which we are common to both was accentuated in the first word, but not in the second; so also 'mind,' but 'growth,' (suffix of 'flood,' but 'death' (suffix -d). Here the regularity seems little less than miraculous; and it was discoveries such as this which led about this time to the rise of what is sometimes called the 'new science of philology,' not merely added to their utmost the principles of their predecessors. For example, Curtius and Schleicher held that the operation of unvarying law in certain cases did not exclude the possibility of 'sporadic changes' —i.e. of changes found in some words only, not in corresponding ones. But Schleicher recognized, thus, 'laerim' in Latin shows an i at the d of the original word, as proved by Greek δαίμων and our 'tair'; but they did not therefore think it necessary that every d should pass into l in Latin. The 'new school'—Leskien, Brugmann, Osthoff, Paul—to mention a few only of the most conspicuous members—held that sound-change so far as it is due to physical causes is absolutely uniform in any one language or dialect at the same time; and that the new form produced by such change in every case drives out the old one. Briefly put, phonetic law is inviolate, and it is no small thing as sporadic change—change attacking a few words, and sparing others; throughout the whole speech-area all words in which a particular sound occurs are alike affected. This doctrine has commanded very general assent; it is tempting to the scientific mind, and its strength lies in the number of apparent exceptions which have been satisfactorily explained. Yet the a priori arguments against it are strong, and it is certain that it is incapable of absolute proof: you cannot prove a negative. But the illustration of its supporters everywhere in the history of philology has been immense. They protested, and rightly, against the habit, seen in the later writings of Curtius and other less men in other languages, of allowing obvious exceptions to ascertained phonetic law on the ground of identity of function. Be the principle of the new men right or wrong, its observance in practice is excellent. But this protest is only one of the services of the new school. They (especially Paul) have called attention to the inner side of language: the older writers had spent themselves on the outer side, and its strength lies in the number of new products. The sounds which make language are due to the physical apparatus of speech. As such their nature can be exactly ascertained, and they are subject to changes which can be known and registered like the phenomena of any physical science (see Phonetics), and may be derived from the outer side of language. The inner development is due to the mind of man; and this, like all the other works of man, belongs to historical and not to physical science. Here the ruling principle is imitation. Every child learns every word it utters through imitation, and imitation of words heard from others or previously uttered by ourselves is the parent-speech of every grown-up man. That we are wholly unconscious of the process does not make the fact any less certain. One form of imitation especially active in speech is what grammarians call 'form-association.' Different forms of speech—e.g. preterite tenses of many verbs, or a particular way of expressing a meaning in their grammatical function, and tend to be thought of, and to be used, together. But these forms are nevertheless often very unlike; though their use may be the same they may have different origins—e.g. 'I swam,' 'I stood,' in English owe their distinctive variation to quite different causes, due to the adding of a suffix. Now, the mind is constantly acting under the influence of analogy to reduce such variations, to do away with unnecessary differences, to reduce old forms to one level, or to make new forms on the analogy of old ones. Thus, as under article GRAMMAR, we may say we 'run' and not 'we run' as our forefathers did, because the reason for the different vocalism of singular and plural is no longer discernible, and the unmeaning difference is 'levelled.' Again, we say 'I climbed,' not 'I clomb' any more because the preterite in ed is the old form, and common agreement condemns the tense, capable of being applied without difficulty when a new verb becomes necessary—e.g. we boycotted him. This principle of analogy (as for brevity it is often called) acts widely in every language; it is the law of the mind, and it must have acted much more upon vernaculars which had no literature (a good example may be seen in the reconstruction of the old Latin verb in modern Italian), and still more upon wholly unwritten languages. There are distinctive chief factors which act on language: one, the vis inerrar, which is the prime cause of phonetic change, and is in the main destructive, doing away with sounds or combinations of sounds which, owing to causes varying with nations and even with individuals, are inconvenient to produce; the other, the innate habit of man, which may destroy old forms, but is in the main reparative, giving new forms for those which through phonetic change had become obscure, and constantly producing new forms on the analogy of old ones to supply what wants in the aggregate of the human mind. For except in very rare cases man turns old speech-materials to new uses. He does not invent absolutely new names for new things as they become known to him or are produced by him. A hippocotomus was called a river-horse; nouns constantly springing up, being commonly either more picturesque or giving some
new circumstance. To murder is old, but to 'murk,' a verb coined from a once famous murderer, gives the added sense of smothering and hushing up; and the word seems likely to survive, though with its origin forgotten. To 'boyect,' express oneself in an abusive manner, is a new descriptive, and as yet its history is remembered.

This slight sketch may suffice to throw some light on the nature of language. It is a work of man, the product of man's mind and vocal organs, just as a statue or a picture is the product of his mind and hands. But it is different from these in some important respects. First, it is not a finished product, permanent and unchangeable. It is subject to incessant change, involuntary on its physical side, partly voluntary on the mental side. It is a constant threefold 'homing,' not a 'being,' as Plato might have put it; this change is obscure for literary languages; it becomes clear at once to any one who will take the pains of looking at the development of English from Chaucer's day to ours. Old forms die out, and new ones take their place (see PERS.), and Old English cases to be used: new ones take their place or are produced under new needs—e.g. the Boycott family—boyocott, boyocett, boyocett (extinct by this time), &c., all formed on the analogy of the words of other older families. A second recognition is that language is not an end in itself as a picture is: it exists for an end, communication between man and man. So long as this is achieved the form which language takes is immaterial: it may change so long as it is intelligible.

No doubt language once existent can serve other ends more or less connected with the first; but that communication was the first is undeniable.

But language is not the only means by which communication can be made. Animals, which have no language, certainly communicate. Man can communicate by gestures, by pictures—whether rude scratchings made on the ground, with a stick or the more polished drawings which developed into Egyptian hieroglyphics—or, lastly, by cries common to man and to beasts, the natural expressions of joy, fear, pain, &c. But such cries are not even the elements of language till they are connected to expressions of the mind, when the stimulating cause may be absent. Language itself arises when two men connect the same feeling with the same expression of it, and so can communicate that to others. There is no reason to believe that any brute has ever attained even to the last two steps. Their progress is arrested. A dog may bark to express delight, or to have a door opened to him, but he does no more than any dog could do 2000 years ago. Man can develop. It is not permissible, however, to lay down that the possession of speech is the barrier between man and the brute, and to settle thereby the question of the origin of man. Speech may be the clear differentia now. But it is at least conceivable that there may have been lost types between man and the common progenitor of man and the anthropoid ape with intermediate stages of speech-development. It is another matter to maintain that such development could have been produced by natural selection alone (see Wallace, Darvinism, p. 461, &c.).

The different languages of the world can be classified in their principal formation; and within the classes so reached different families of languages may be distinguished in which a common origin can be proved for the different languages of each family. Only the briefest sketch can be attempted here. We find two main families of these language signs (or hardly any signs) of indication (see Grammar) — e.g. in which the plural of 'man' is expressed not by vowel-change (as our 'men') nor by an added suffix (as in Latin 'lumnus-er') which has no independent value, but by such a combination as our 'man-kind,' where each part can be used independently. Such languages are the Chinese, the Himalayan, and the neighbouring states; they are commonly called Isolating. I1. Those which possess some degree of inflection—i.e. elements which have lost their independent meaning, and are mere grammatical machinery to make nouns, as fer in 'pa-ter,' or cases of nouns, as 'fadder—of groups of verbs, as s or th in 'gives' or 'giveth.' Such elements, however, are only the worn-out remnants of words compounded with other words (see Grammar); and the languages of this type may vary very much according to the degree of obscuration in the character of the compound. Some, like the Mongolian, the Finnish, the Hungarian, the Turkish, make very long compounds, yet the original elements, though not all capable of separate use, remain quite distinct and recognisable. Each language needs to be called 'agglutinative,' as different from the purely inflectional Sanskrit, Latin, &c.; but even these show signs of the phonetic change which produced inflections. The North American languages incorporate different elements which are each barely recognisable in the compound; the principle of composition is really different. The Aryan family of languages in South India—Tamil, Telugu, &c.—is also of the agglutinative sort. The languages of the purely inflectional type—i.e. those where the different elements of the original compound are so firmly welded together as to be frequently indistinguishable—are (1) the Semitic family, comprising Hebrew and the closely-connected Phoenician; Aramaic, spoken in Mesopotamia, Syria, and in later days in Palestine; Arabic; and some Abyssinian languages. This family is remarkable because its language shows the relation of the several ideas by three unchanging consonants, the relation of the various derived forms of the same idea being expressed by vowel-change. (11.) The Indo-Germanic or Aryan family. The first term is most likely to survive; it denotes the extreme of inflection. The languages spread—from Sanskrit Indic to Germanic (or Teutonic) Iceland. The term Aryan has not been adopted much outside of India. The chief languages of this family are (1) Sanskrit, of which the oldest remains are the Vedic hymns, with the compound Old Persian, which is much more ancient; (2) Armenian, as yet imperfectly known, with records dating from the 5th century A.D. (3) Greek, with its numerous dialects. (4) Albanian, proving to belong to this family by Bopp, and lately investigated by G. Meyer and others, but possessing no ancient records. (5) Italic, including Latin, and the Umbrian and Ocean dialects: from these are descended the modern (so-called) Romance languages—the Italian, Spanish, Portuguese, French, Wallachian, and the speech of certain Alpine districts (Grisons, &c.). (6) Celtic, including the ancient speech of Gaul, with its surviving remnants, the Bas Breton; the now extinct Cornish; the Welsh, still likely to survive; the Erse of Ireland; the Gaelic of the Highlands of Scotland (the records of these three date from about the 8th century); and the Manx. (7) The Teutonic, now more advanced. The ancient speech of Gothic, into which Ulfils translated the Gospels in the 4th century A.D.; the Scandinavian, of which a very old form is isolated in Iceland, more modern forms in Norway, Denmark, Sweden; the Anglo-Saxon; the Old Frisian; the Old Saxen of the 'Helland,' the parent of the Platt-Dentish languages of North Germany;
the Lower Franconian, whence comes the Dutch; the Franconian of Mid Germany; and the Old High German, spoken in different dialects from South to East of Central Europe, Asia and making modern literary German. (8) The Slavonic, to which belong Bohemian, Polish, Old Bulgarian, and the parents of the Russian and numerous dialects of south-eastern Europe; together with the Lithuanian, Old Prussian, and Lettsish languages of the same Baltic, while their identity have yet preserved strikingly early linguistic features. See Aryan Languages.

That there was such a language as the hypothetical parent of all these Aryan languages is certain (though such knowledge brings us no nearer to the one original language than if one there was—spoken by a Primeval Man). We can recover its character with certainty, for we know its suffixes both formative and inflectional; its vocabulary we know in part only. Now, if there was a language there must have been a people to speak that language—no doubt with many dialects, whence eventually sprang the derived languages which we know, and probably many others which are lost. Dialectal variation is the inevitable condition of all languages where there is no common literary tongue: the habit of the speech of a nation, and where there is great facility of communication throughout the area the dialects may die out, as they are rapidly doing in England. But though we assert with confidence that there was a common Indo-Germanic language, spoken by an Indo-Germanic people, we do not maintain that this people who speak the several languages derived from that the common parent are wholly of the same race, England, as we know, is inhabited by the descendants of Celts, of various nationalities enrolled in the Roman legions, of Angles, Saxons, Jutes, Frisians, of the oriento-Normans, and others whose language we speak the same English language. But that fact does not make us doubt that there was once a common Tentinonc language spoken (in various dialects) by the different members of a Tentinonc race which occupied Britain. It is extremely probable that there has been a like history in other lands where other Indo-Germanic languages are now spoken. That does not in the least disprove the existence of an Indo-Germanic race, speaking different Indo-Germanic dialects, settling themselves in the different countries, at the North of the modern territories of their blood with that of the races whom they found already there. The proportion of Indo-Germanic blood in any given nation may be considerable: it may be very little. It is possible that in some nations it may be nothing at all; some stronger, but less civilised race may have overpowered the Indo-Germanic stock, but taken their language. Such loss has its parallels in history—e.g. when the Norsemen conquered part of France, but lost their own language. This would explain the fact that races of marked racial differences, such as the Skulks and the Mandchus, are found speaking cognate languages with men of long skulls, ruddy colour, and light hair. Such an inconsistency has seemed to some anthropologists to absolutely destroy the value of language as a test of race. It does show that the Teutonic race as such are as valuable as anthropological ones; but neither give conclusive proof, only indications. The two sciences should work independently. Good anthropologists, such as Pöschle and Penka, may be bad linguists; but results drawn from harmony of the strongest evidence on either side may be fruitful. Most, however, of these problems will probably never admit of certain solution. The evidence which now would place the habitat of the parent-race in northern Europe is only somewhat more weighty than that which formerly placed it in Pamir.

See especially Paul's Principiën der Sprachgeschichte, translated by Strong (1888); and the History of Language (based on the same book), by Strong, Logeman, and Wheeler (1891). For Pischeking's Lehrbuch der Linguistik (Int. Sc. Series), Max-Müller's Essays on the Science of Language, and Sayce's Introduction to the Science of Language are the latter contains a full list of authorities. By far the best book on the Indo-Germanic languages in their earlier stage is Brugmann's Comparative Grammar (trans. vol. i. by Wright, vol. ii. by Connolly and Rousse, 1888). Here will be found mentioned all the recent works of any importance in this department. A short book referring chiefly to Greek and Latin is Victor Henry's Préci's de Grammaire Comparée (1889), also translated. For Romance languages the latest and most complete work is Griesbach's Grundriß der Romanischen Philologie (Strasburg, 1886—88), in which the different Romance languages are treated by the most competent authorities. Diez's Grammatik der Romanischen Sprachen, though somewhat out of date, is clear and good. A similar book on the German languages is Paul's Grundriß der Germanischen Philologie (1889 et seq.). Special students of English should use Sievers-Cook's Grammar of Old English (Ginn, Heath & Co, 1889). See Sweet's History of English Sounds (1888), and Skeat's Principles of English Etymology (1887 and 1891). For Phonetics, Sweet's Handbook of Phonetics should be consulted. All questions on the origin of the Germanic language and of its derivatives are exhaustively treated in the Prehistoric Antiquities of the Aryan Peoples (Schinz-Weisse, 1890). Isaac Taylor's Origin of the German Race (1817) was useful before this subject. The grammars and other works dealing with the modern languages of Europe are too numerous to be mentioned here.

Philomela, according to the Greek legend, was changed into either a swallow or a nightingale. Poets are (or rather were) fond of calling the nightingale by its classical name.

Philopomen, a patrician of Greece, was born at Megapolis about 225 B.C. In 222 he was one of the defenders of Megapolis against Cleomenes, king of Sparta, and next year he fought with the Macedonians against the Spartans. He then served in Crete with such distinction that in 210 he was appointed general of the Aegean horse. In 208 he was elected to the highest military dignity in Greece, being elected strategos or commander-in-chief of the Aegean League. The battle of Mantinea (208), in which the Spartans were again utterly routed, raised him to the pinnacle of fame, as well as of wealth, which he used to benefit his proclaimed liberator of Greece. So great was his influence that the Macedonian monarch, Philip, began to fear that Greece would regain its independence, and tried, vainly, to have him secretly assassinated. During the next few years he was absent in Crete, and returned to the Peloponnesus in 194 to find the Romans in Greece. On the departure of the consul Flaminius, Nabis of Sparta recommenced hostilities against the Achaeans; Philopomen was once more appointed strategos (192), and by his Persuasion nearly converted the league of Nabis. He now exerted all his power to heal the divisions among the Achaeans, and to prevent them from amusing the Romans a pretext for taking away their independence. In 188 he took a fierce revenge on Sparta where he had put a number of his friends to death, and was in consequence strongly censured by the Roman senate, and by Q. Cecilius Metellus, who was sent out as a commissioner to Greece in 183. Two years later Philopomen (now an old man of seventy) was elected strategos for the eighth time. When lying ill of a fever at Argos he rose from his sick-bed to quell the revolt of the Messenians, but was overpowered by numbers, and fell into the hands of Deinocrates, the leader of the Messenians, who two nights after sent him a cup of poison. Philopomen drank it and died.
Philosopher's Stone. See Alchemy.

Philosophy. In a subject where opinion has been and is still so much divided, as is the case in philosophy, it would be vain to attempt to formulate a definition which would be accepted by everyone. The objects of the science, its methods, may its unity or harmony in our conception of the universe, is the only safe guide in such a case; and by its aid we are happily able to fix upon the main elements that were present to the minds of the Greek thinkers who first consciously used the term with a sense of unity or harmony in our conception of the universe, and the definitions of all attempts at definition are to be found in Plato and Aristotle, and as these two philosophers dominated the human intellect for two thousand years, the ideas which they expressed on the subject inevitably shaped the conception of philosophy current during that time. In virtue of its long lease of life, this conception has established itself in the associations of language, and is vaguely present to the man of ordinary culture when he uses the term. It may claim, therefore, to be the historical sense of the term—the sense, that is to say, which it bore at any time, which it bears now out as that which has persistently asserted itself during more than two millennia of human progress. Pronounced deviations from the accepted usage occur mainly in connection with a sceptical or quasi-sceptical theory of knowledge, and will be dealt with later.

Tradition assigns the first employment of the word to Pythagoras, and makes him use it to signify merely the disinterested pursuit of knowledge. Socrates plays upon the etymology of the word, and contrasted the modesty, the truth-seeker, with the haughty, the self-seeking, the self-asserting, of the sophists. But, so far, the nature of the truth or knowledge which the philosopher seeks is not specified; the term is still vague and general. In fact, no kind of knowledge was at first alien to the philosopher. Philosophy has been truly called 'the mother of the sciences,' and it was only by slow degrees that the separate sciences attained an independent life. As specialization proceeded, however, philosophy could no longer in a literal sense 'take all knowledge to be her province;' the definitions of its domain after another of existence were surrendered to the scientific specialist. But the claim of philosophy to be the necessary complement of the special sciences—the only science of existence or of the universe as a whole—was not thereby surrendered. The specialist, so far as he is a true specialist, is like the man who cannot see the wood for the trees; he loses sight of the proportions of the whole in the details of his own province. The co-ordination of the sciences, the unification of knowledge, is a task which remains to be undertaken by the philosopher. Unity or harmony in our conception of the universe is the aim which philosophy always has in view. Whether this aim is attainable by man or not is a further question; but the idea of a system of things satisfactory to the reason and the moral sense remains the inextinguishable spring of philosophy. The philosopher, therefore, always has his eye upon the Whole; his true function is to correct the abstractions of the special sciences. Each science makes, and must make, its own working postulates or presuppositions, and the specialist is in error to make the working postulates of his own science (a mere portion of existence) as such. But philosophy has to review all these scientific postulates, and if possible to harmonize their conflicting claims by showing the relative and limited validity which belongs to each. Philosophy is in this connection the critic of the sciences—of the postulates which they make and the conceptions which they use; and she exercises this critical office in the interest of the Whole.

Something like this was present to Plato's mind when he described the philosopher as dunamis, a man who insists on seeing things together, who refuses to consider the parts out of their relation to the whole. It was a great advance, and therefore the inexorable foc of crude and premature generalisations from this or the other department of investigation which happens for the time to be most in evidence.

In Philosophy, however, already established a second account of philosophy, which, though unquestionably true in itself, has led, in the opinion of the present writer, to many questionable developments. The philosophers, says Plato, 'are those who are able to grasp the eternal and immutable,' 'those who set their affections on that which in each case really exists.' The philosopher, as the man who apprehends and follows after the essence or reality of things, is thus opposed to the man who dwells in appearances and the shows of sense. This distinction may be said to be implied in the demand for an explanation at all, and is present in Greek philosophy from the time of Pythagoras. Substance or unitary reality underlying all the diversity of the world around us? So ran the question which the early Greek thinkers asked themselves; and the explicit opposition between the world as it appears to the case and the world as reason recognizes it to be had already appeared (otherwise diametrically opposed) in Parmenides and Heraclitus. In the Platonist doctrine of transcendent Ideas the opposition receives a questionable expression; it appears more legitimately in the Aristotle doctrine of Substane and Cause. The philosopher, indeed, may set his face against the world and ask himself, What is the essence, the ultimate reality of things? who or what is the Being that is manufactured in 'all thinking things, all objects of all thought'? In this sense philosophy is still definable, in Aristotle's phrase, as Ontology, the science of being as being.

To very many, however, in modern times the search for this ultimate reality seems a hopeless quest, and philosophy therefore, in the form of metaphysics or ontology, is condemned by them as a mere postulate, a speculation. But under the influence of scientific habits of thought, it is now happily recovering. The Empiricism which bases itself on Hume, the Positivism which founds on Comte, and various phases of Kantian thought agree in this repudiation of metaphysics. The distinction between phenomena and noumena, which has been revived in a somewhat different form, and has become current in popular thought. Sensible objects and their laws may be known, it is argued, because in such an investigation we are not carried beyond the facts of present and possible experience; and these phenomena. But if we refuse to take this sensuous phantasmaporia simply as it stands—if we insist on referring it to some ultimate ground of existence as an explanation of why and how there is a phenomenal world at all—the object of our search is variously said to be nonmetal, metaphysical, metempirical, or transcendental, and to be unattainable by human reason. To those who hold this view philosophy becomes convertible with Epistemology or Theory of Knowledge (Erkenntniss-theorie). It becomes an inquiry into the human understanding, or a 'criticism' of the human understanding, by way of fixing the limits of our necessary ignorance, and thus justifying the negative position assumed towards metaphysics. To Hume and Comte, and to Kant himself in some of his moods, philosophy is thus a preventive against itself, or at least against what has ordinarily
Psychology, may be said to have established its
claim to be an independent science of observation
and experiment. Thus it may fall more
and more into the hands of specialists, it will always
remain connected with philosophy, seeing that the
knowing mind is the object which the psychologist
investigates. Similarly, Ethics is often treated as
the science of moral reality or of the moral sense,
but so conceived it really forms a part of scientific psychology. The strictly
philosophical part of Ethics is the theory of
obligation, and this is sometimes spoken of as the
Metaphysic of Ethics. The meaning assigned to
that designation given to it by Aristotle
necessity profoundly influence the general concep-
tion we may form of the universe. So, again,
Aesthetics may be treated as a department of
physiological psychology, as has mostly been the
case in England; but by many continental writers
the Philosophy of Art or the Philosophy of
the Beautiful has been intimately connected with
metaphysics. Jurisprudence on its philosophical
side is closely connected with Ethics, and is some-
times spoken of as the Philosophy of Law. The
Philosophy of History and the Philosophy of Rel-
igion exist only in theory; but the moral and
dead facts of history and in the different religions of
man the evolution of an idea or purpose, Logic,
as the science of the regulative laws of thought,
forms a part of the general theory of knowledge.
It holds aloof, however, from the central question
of Epistemology. It presupposes the relation of
our thought to reality, but does not itself investi-
gate that relation, confining itself to the laws by
which we may validly pass from one statement to
another. It occupies a preparatory or introductory
position in relation to the problem of meaning, and
indeed in relation to scientific thought generally.

The History of Philosophy forms not the least
important philosophical discipline. Philosophy
cannot, indeed, be profitably studied apart from
the history of its own development. Speculative
thought has been described to us, and elsewhere, as
but to all intents and purposes the history of philosophy
begins with Thales in Greece about 600 B.C. It is
usual to distinguish three great periods of philo-
sophic thought—Ancient or Greek Philosophy, from
600 B.C. to about 300 B.C.; Medieval Philosophy,
from 300 B.C. to about 1000 A.D.; and Modern
Philosophy, after that date. Greek Philosophy is in turn divided
into three periods—that of the pre-Socratic philo-
sophers (say 600 to 425 B.C.), who devoted their
attention mainly to the phenomena of external
nature. Pythagoras, Heraclitus, Parmenides,
Anaximenes, and Anaxagoras were the most eminent heads of mutually conflicting schools.
The Sophists and Socrates raised the question of
knowledge, turning man’s attention upon himself;
and in the idealistic systems of Plato and Aristotle
(say 400-322 B.C.) we have the great age of Greek
philosophy. In Aristotle the theoretical impulse of
the Greek mind seems to have exhausted itself,
and the post-Aristotelian or third period of Greek
philosophy was mainly inspired by practical need,
by the desire for a theory of life and conduct.
The Stoics, Epicureans, and Sceptics, and later the
Neoplatonists with their religious mysticism, carry
on the tradition of philosophy till the downfall of
the Roman empire and the death of Boethius. After
the so-called dark ages Medieval Philosophy may
be said to begin. From 600-1000 A.D., which was the
Scots Erigena, who is really a Christian Neo-
platonist. Medieval philosophy is mainly the
application of the Aristotelian logic to the
doctrines of the church, and latterly (when the other
treatises of Aristotle became known in western
Europe) exhausted itself in an elaborate attempt
to harmonize the philosophy of Aristotle with
Christian theology. Anselm and Abelard in the earlier period, Albertus Magnus, Thomas Aquinas, Duns Scotus, after about the age of Dekkman in the later, are probably the greatest and most representative names of the Scholastic philosophy. The Renaissance put an end to Scholasticism, and led, in the 16th and 17th centuries, to various attempts to revive the systems of the older philosophers and to strike a new path; but the age was one of failure, and no effective beginning was made in Modern Philosophy till the commencement of the 17th century. Bacon’s Novum Organum was published in 1620 and Descartes’ Discourse on Method in 1637. Bacon’s investigations were mainly logical and methodological, and Descartes was the real founder of modern philosophy. Cartesianism was developed on the Continent into the great monistic system of Spinoza, from which the monadistic or individualistic theory of Leibnitz was a reaction. In England philosophy took an epistemological and even psychical direction. The greater part of Locke’s work was continued by Berkeley and Hume, who developed Locke’s dualism into subjective idealism and scepticism respectively. Hume’s sceptical analysis of knowledge gave rise by revulsion to the Critical philosophy of Kant, which combines elements both from the Continental and the English line of thought. From it sprang the idealistic developments of German thought in Fichte, Schelling, and Hegel, and also the realistic systems of Schopenhauer and Hartmann. Herbart and Lotze represent a realism of a more individualistic cast, which affiliates itself directly to Leibnitz, and is comparatively little influenced by Kantian thought. Scottish philosophy has maintained the reality of knowledge and the dualism of experience in answer to the scepticism of Hume, but like English philosophy generally has been mainly psychological in character. It has been utilized in this way not only parallel to the vast metaphysical systems which have succeeded one another in Germany.

The best general histories of philosophy are by Erdmann, Ueberweg, and Schwägerl, all accessible in English translation. The most recent part of Locke’s exhaustive history of Greek philosophy has also been translated. See also the following articles, and works there cited:

- Asthetics
- Agnosticism
- Atheism
- Association
- Bacon
- Berkeley
- Causality
- Common Sense
- Comte
- Conside
- Deshumanism
- Eclecticism
- Eklekismus
- Greek School
- Hypomnestics
- Empiricism
- Idealism
- Ethics
- Fichtes

Philostratus of Lemnos, a famous Greek sophist and rhetorician, was born probably about 170-180 a.d., studied under Proclus at Athens, and finally established himself in Rome, where he became a member of the learned circle that gathered round the Empress Julia Domna, wife of Severus. He was alive, according to Suidas, in the time of the Emperor Philip (244-249). His extant works are an idealised life of Apollonius of Tyana; the Imagines, a declamatory exercise on Homer’s Injustice to Phædæus; and a series of oratory and somewhat strained riddles.

There is a good edition of forty-four pictures attached to re-hung in a villa near Naples; the Lives of the Sophists, a series of bright and interesting sketches; the Hermias, a declamatory exercise on Homer’s Injustice to Phædæus; and a series of oratory and somewhat strained riddles.


Philpotts, or Philpotts, Henry, was born at Bridgwater, 6th May 1778, studied at Corpus Christi College, Oxford, and was elected Fellow of Magdalen College in 1795. He became Master of Magdalen College in 1809, Dean of Chester in 1828, and Bishop of Exeter in 1831. A zealous Tory, an extreme High Churchman, and combative by disposition, he was ever the foremost in opposition to measures of reform, and his name would survive if only for his ‘Philopatris’ and ‘Philopatris’ (now &c.). He was for not believing in baptismal regeneration. Yet if he was narrow he was devoted and sincere, his standard of a bishop’s duties was an unusually high one, and he was much beloved throughout his diocese, situated near Torquay, 18th September 1860. See his Life, Times, and Writings, by the Rev. R. X. Slutte (vol. i. 1863).

Philtre (Gr. φιλτρον, ‘love-charm’). A superstitious belief in the efficacy of certain artificial means of inspiring and securing love seems to have been generally prevalent from very early times; and among the Greeks and Romans love-charms, are extensively preserved. It is not certainly known of what these love-potions were composed, but there is no doubt that certain poisonous or deleterious herbs and drugs were among their chief ingredients, to which other substances, animal as well as vegetable, are said to have been added, coupled with the employment of magick rites. Thessaly had the credit of producing the most potent herbs, and her people were notorious as the most skilful practitioners of magic arts, whence the well-known ‘Thessala philtra’ of Juvenal (vi. 610). These potions were violent and dangerous drinks, and their use, in the weakening of the mental powers, madness, and death instead of the purpose for which they were intended. Lucertius is said to have been driven mad by a love-potion, and to have died by his own hand in consequence. In the corrupt and licentious days of the Roman empire the manufacture of love-charms of all kinds seems to have been carried on as a regular trade, the purchasers, if not the makers of them, being chiefly women. The use of philtras seems to have been not unknown during the middle ages; and in the East, the more superstitious nations, the power of love-potions linger down to the present day.

Philips, or PHIPPS, SIR WILLIAM, governor of Massachusetts, was born at Pembury (Bristol), Maine, on 24 February 1651, one of twenty-one boys in a family of twenty-six children. He was successively a shepherd, a carpenter, and a trader, and in 1671 recovered from a wrecked Spanish ship off the Bahamas balloon, plate, and treasure valued at £200,000; this gained him a knighthood and the appointment of sheriff of New England. In 1690 he captured Port Royal (now Annapolis) in Nova Scotia, but failed in the following year in a naval attack upon Quebec. In 1692, through the influence of Increase Mather (q.v.), he was appointed governor of Massachusetts. He changed the manner of the witchcraft persecutions by appointing a commission of seven magistrates to try cases; and he died on 18th February 1714, at Bridgewater, Whitley, where he had been summoned to answer certain charges of arbitrary conduct. See Life by F. Bowen in Sparks’ American Biography (1834-37).

Phiz. See BROWNE (HAIRLOT K.).

Phlebitis (Gr. φλεβίθης, ‘a vein’), inflammation of the veins, although seldom an original or idiopathic disease, is a frequent sequence of wounds, and is not uncommon after delivery. The disease
PHLAEOLITES

PHOCION

is indicated by great tenderness and pain along the course of the affected vessel, which feels like a hard knotted cord, and rolls under the fingers. See Vains.

Phleboites (Gr. phebe, 'a vein,' and lithos, 'a stone') are calcareous concretions formed by the degeneration of coagulations in veins, or occasionally originating in the coats of the vessel.

Phlebotomy, or VEINECTION, is, as applied to human beings, treated at BLEEDING, Vol. II, p. 221. The abstraction of blood was at one time considered, say from 3 to 6 or even 8 quarts, the cord tied round the animal's neck below the seat of the intended operation. This cord should be from 4 to 6 inches in length, and short enough to arrest the flow of blood and cause the vein to become distended and tense. It should then be opened with the 'blood stick,' so as to pierce the skin and vein at one blow.

When a sufficient quantity of blood has been abstracted, say from 3 to 6 or even 8 quarts, the cord is slowly slackened so as to prevent a vacuum and the ingress of air into the vein, the lips of the wound brought into opposition and maintained there by a pin passed through them, and around it twine or tow is twisted in the form of a figure of 8. The pin should not be removed for at least thirty hours.

Phleg'cthon (i.e. 'the dwelling'), a river of the infernal regions, whose waves rolled torrents of fire. Nothing would grow on its scorchcd and desolate shores. After a course contrary to the Corinthus, it descended itself, like the latter stream, into the Lake of Acheron.

Phleum. See TIMOTHY GLASS.

Phlogiston (Gr. phlogistos) was the term employed by Stahl, professor of Halle, in his Zynograteincm Fundamentalis (1697), to designate a hypothetical element which, by combining with a body, rendered it combustible, and which occasional combustion by its diacquayg, there being left, after its evolution, either an acid or an earth.

Thus, sulphur, according to the phlogistic theory— which held undivided sway in chemistry until the time of Lavoisier, who substituted for it the theory of oxygenation (1775-51), heat was maintained by a few chemists, especially Priestley, till the breaking up of the 19th century—was composed of sulphuric acid and phlogiston; lead, of the calx or earth of lead and phlogiston; &c. In consequence of the general adoption of the phlogistic theory, when Priestley, in 1774, discovered oxygen, and when Scheele, a little later, discovered chlorine, the names these chemists gave to their discoveries were deplogisticated air and deplogisticated marine acid. According to modern views, mainly based on Lavoisier's experiments, the addition of oxygen takes place in the formation of acids and of earths, instead of the subtraction of phlogiston.

The question whether the process was, in fact, one of addition or subtraction was finally decided by the balance, an instrument to which chemistry owes most of its marvellous progress during the last three centuries of a quarter. See CHEMISTRY, Vol. III, p. 146.

Phlox. a genus of plants of the natural order Polemoniaceae distinguished by a prismatic calyx, salver-shaped corolla, and unequal filaments. The species are pretty numerous, mostly perennial plants, with simple leaves, and mostly natives of North America. A number of species are common in British flower-gardens. It has of late become a favourite genus with florists, and many very fine varieties have been produced.

Phlox. See DYEING.

Phoece, the most northerly of the Ionian cities in Asia Minor, originally a colony from Athens. It stood on a peninsula between the gulfs of Elais and Smyrna, and had an excellent harbour; and the Phocaeans were distinguished among the Greeks for their nautical enterprise. When the city was besieged by the Persians in the time of Cyrus, many of its inhabitants emigrated to Corsica; Massilins (Marseilles) was a Phocean colony. The old city survived till the later empire; its ruins are still known as Koradesci Tokia.

Phocera. See PORPOSE.

Phocas, a tyrannical emperor of Constantineople (602-610). See BYZANTINE EMPIRE.

Phocidae. See SEAL.

Phocion (Gr. Phòkìos), an Athenian general, was born about the end of the 6th century B.C. He was of humble origin, but studied under Plato, Xenocrates, and perhaps Diogenes also. Phocion first attracted notice in the great sea-fight at Naxos (376), where he commanded a division of the Athenian fleet. In 331, along with Evagoras, he undertook the conquest of Cyprus for the Persian monarch, Artaxerxes III., and was completely successful. In 341 he was successful in crushing the Macedonian party in Euboea and in restoring the ascendency of Athens. Two years before this he had achieved a similar result at Megara; and in 340, sent to the aid of the Byzantines against Philip, he forced Philip to abandon the siege, and even to evacuate the Chersonesus. Nevertheless, he advocated, even in the midst of his triumphs, the establishment of better relations with the enemy, for he had come under the influence of the philosophical reaction in favour of monarchy in stead of a democracy of petty aims and degenerate character. He had come to see that a voluntary acquiescence in the supremacy of an enlightened ruler was better for Athens and for Greece than a hopeless struggle in defence of a political system that had lost its virtue. His advice was not taken; but the fatal battle of Charonea, only two years afterwards, in which the independence of the Greek republics was lost for ever, proved his soundness.

After the murder of Philip in 336 we see him struggling at Athens to repress what appeared to him the reckless desire for war on the part of the fanatical patriots, on account of which he was regarded as a traitor; but his personal honour is above suspicion. On the death of Alexander in 323
the aged Phocion endeavoured, but in vain, to hinder the Athenians from going to war with Antipater. After Antipater's death he was involved in the intrigues of Cassander, the rival of Poly- sperchon, and was forced to flee to Phocis, where Polysperchon delivered him up to the Athenians. He was put to death by a mob of disfran- chised citizens, foreigners, and slaves 'to drink hem- lock. His body, having buried over the borders of the state, was carried by some of his friends to Eleusis, and burned there. The Athenians soon began to raise monuments to his memory. His life and death are treated of in the lurid hue Phociai and seine neuen Beutheiter, by Jacob Bernays (1881).

Phocis, a province of ancient Greece, west of Bocotis, and bounded S. by the Gulf of Corinth. The greater part of the country is occupied by the mountain-range of Parnassus (q.v.). The state derives its chief historical importance from possess- ing the famous oracle of Delphi (q.v.). During the Peloponnesian war the Phocians were close allies of the Athenians. In the time of Philip of Macedon they were involved in a ten years' war, on account of their opposition to a decree of the Athenian government, compelling the use of a piece of land belonging to the temple of Delphi. This war, commonly known as the Sacred or Phocian War, ended disastrously for the Phocians, the whole of whose cities (twenty-two in number) were destroyed, with one exception, and the inhab- itants parcelled out among the hamlets. Phocis and Phthia, among a form of modern Greece.

Phocus (i.e. 'the Bright'), an epithet, and subsequently a name, of Apollo. It had reference both to the youthful beauty of the god and to the radiance of the sun, when, latterly, Apollo became identified with Helios, the sun-god.

Phoenicia, the Φωνια of the Greeks, the Phoeniç, or (sometimes) the Phoenici of the Romans, was a tract of country, lying to the north of Palestine, along the coast of the Mediterranean Sea, bounded by that sea westwards, and eastwards extending to the mountain-crests of Berytus and Lebanon. The limits of the tract northward and southward were not, as is commonly supposed, determined by rivers, and no doubt varied at different periods; but modern researches seem to indicate that the actual Phoenician occupation did not extend beyond the river Litania (Latakia) on the north and Acre, or at the utmost Carmel, on the south. This would give the coast-line a length of about 200, or, counting main indentations, of 230 miles—a fair mean between the 120 miles of Mr Grote (History of Greece, vol. iii. p. 354) and the 300 of some writers. The width between the coast and the mountain- ridges of Berytus and Lebanon varies from 8 to 10 to 25 or 30 miles, perhaps averaging 15 miles. The area of Phoenicia proper may thus be reckoned at about 3000 sq. m. The tract included within these limits is one of a remarkably diversified character. Lofty mountain, steep wooded hill, chalky slope, river valley, broad plain, and sandy shore succeed each other, each having its own climate, while these are hanged by contrast. The sand is confined to a comparatively narrow strip along the seacoast, and to the sites of ancient harbours now filled up. It is exceedingly fine and of excellent silicious quality, especially in the vicinity of Beirut, and at the foot of Mount Carmel. The most remarkable plains are those of Acre, Tyre,Sidon, Beyrut, and Marathus—none of them very extensive, but richly fertile, and capable of producing, under any tolera- ble system of cultivation, luxuriant crops. From the edges of these plains, and sometimes from the very shore of the sea, rise up chalky slopes or steep rounded hills, which at the present day are partly left to nature and covered with trees and shrubs, partly cultivated and studded with villages. The hilly region forms generally an intermediate tract between the high mountains and the plains; but not infrequently it consists of level, rich soil, and fills the undulations the whole space, leaving not even a strip of lowland. This is especially the case in the central region between Beyrut and Arka, opposite the highest portion of the Lebanon; and again in the north, between Cape Pessidi and Jebili, opposite the more northern part of Berytus. The hilly region in these places is a broad tract of alternate wooded heights and deep romantic valleys, with streams murmuring amid their shades. Sometimes the hills are cultivated in terraces, on which grow vines and olives, but more often they remain in their pristine condition, clothed with masses of tangled under-wood.

From the hilly tract, which increases in elevation as it recedes from the shore, rise the two great mountain-regions, separated by a clearly- marked basin, called the plain of Phoenicia in 34 29' north latitude, which runs the river Eleuthers. The more north- ern of the two was known to the ancients as Berytus, and in modern geography bears the name of the Ansarieh or Nasarieh mountain-region. It extends from the Orontes near Antioch to the violet Eleuthers, a distance of less than 100 miles, looking down eastward on the lower Cale-Syrian valley, and westward on the undulating tract known as 'Northern Phoenicia.' Though not comparable to Lebanon, it is a romantic and picturesque region. The lower spurs towards the west are clothed almost entirely with vineyards, or covered with myrtles and rhodo- dendrons; between them are broad open valleys, productive of tobacco and corn. Higher up the scenery becomes wild and bold; forests of fir and pine abound, and creep up the mountain-side, in places almost to the summit; while here and there bare masses of rock protrude themselves, and crag and cliff rise into the clouds that hang about the loftiest summits. But the glory of Phoenicia is Lebanon. Extended in a continuous line for a distance of 130 miles, with an average elevation of over 8000 ft. above the sea, and on its eastern side, it formed a wall against which the waves of eastern invasion naturally broke. The flood of conquest swept along its eastern flank, down the broad vale of the Buka's, and then over the hills of Galilee; but its drowning precipices and its lofty crags deterred or baffled the invader, and the smiling region between its summit and the Mediterranean was, in the early times at any rate, but rarely traversed by a hostile army. This western region it was which held these inexhaustible stores of forest trees and woods, of iron and copper, of wheat and corn; and to the west she ministered the fruits and corn of her immense commercial navy; here were the most productive valleys, the vineyards and the olive-grounds; and here, too, were the streams and rills, the dashing cascades, the lovely delts, the deep gorges, and the magnificent cedars which gave her the palm or all the surrounding countries for variety of picturesque scenery. The principal rivers of Phoenicia were, in the north, the Badés or Nahr-el-Melk, 6 miles south of Jebili; the Nahr Amrith, a strong-running stream which reaches the sea a few miles south of Tortosa and the Nahr of the Arab Fares and the Nahr Kanso, which joins the Nahr Amrith near its mouth; and the Eleuthers or Nahr-el-Kebir, which reaches the sea a little north of Arka. In the central region are the Nahr-el-Beiril or river of Orthosa; the Kudisha or river of Tripolis; the Ibrahim or Adonis; the Nahr-el-Keib or Lycus; the river of Beyrut or
Magoras; and the Damour or Tamyras. Finally, towards the south are the Nahar-el-Anu or Bostrenus; the river of Sidon; the Litany or river of Tyre; the Zaherany or river of Sarepta; and the Biq Jezzar, or river of Ake (Akko). These rivers, except the Litany, range from the sea to the mountains. From the mountain-chains near their crest, and run in deep-wooded valleys, at right angles to the axis of the chains, which is from north to south, having short courses, but conveying generally a good body of water. The last two issues on the eastern flank of the mountain and, running into the Cedars, formed the Cèle-Syrian valley between Lebanon and Anti-Libanus for a distance of 60 miles, turns suddenly to the west, and passes by a deep gorge through the roots of Lebanon to the sea. The Phoenician seacoast is but slightly indented, and possesses few but prominent headlands. The most important are Carmel, if that may be reckoned to Phoenicia; the Ras-el-Abiad, 10 miles south of Tyre; the Ras-el-Jajunieh, a little north of Sidon; the Beyrouth promontory; and in the north Cape Pessis. Of natural harbours we are wanting, except where littoral islands offered a protection from the prevalent winds, as at Tyre and Aradus; elsewhere nature provided nothing better than open roadsteads; and the famous harbours of the Phoenicians were all of them the work of art.

The geology of Lebanon is tolerably simple. Both Barygus and Lebanon are longitudinal ranges of the early cretaceous limestone, a limestone that is soft and pliable, very easily worked, but wanting the qualities needed for the initiatory arts. This simple formation is, however, intruded upon by some masses of igneous origin, especially in the lower ridges. 'Down many of the valleys run long streams of trap or basalt; occasionally there are dykes of porphyry and greenstone, and then patches of sandstone, before the limestone and flint rock.' (Tristram, Land of Israel, p. 634.) Some slopes are composed entirely of soft sandstone; many patches are of a hard metallic-sounding trap or porphyry; but the predominant formation is a greasy or powdery limestone, and this is the sole material of the higher ranges. The softest of all the ranges of Lebanon. The limestone of a rapid vegetation and the accumulation of vegetable soil, which, washed down by the rivers, covers the more open valleys and the plains which fringe the coast with an alluvium of the most productive character. Its mountain-regions must also have furnished Pli Planta, the inexhaustible supply of excellent timber—fir, pine, and cedar; the lower slopes of its hills were admirably adapted for the cultivation of the olive and the vine, while its maritime plains were equally fitted for the growth of corn and of almost every kind of fruit and vegetable. In mineral products it may have been deficient; but the sandstone of the Lebanon is often largely impregnated with iron, and some strata towards the southern end of the mountain are said to produce as much as 60 per cent. of pure iron ore. An oomorphous earth is also found in the hills above which gives from 50 to 60 per cent. of metal. Coal, too, has been found in the same locality. Finally, the geologist Fras has recently discovered immemorable traces of amber-digging on the Phoenician coast. It may be gathered that rare substances were also in the early times among Phoenician products.

Race and Language. — The Phoenicians have been regarded by some as a nation of Hamitic origin, akin to the Egyptians, chiefly on the ground that Sinitc is the only language which bears any marked resemblance to the fifth chapter of Genesis (verses 6 and 15). But the evidence of language, of physical type, and of mental characteristics far outweighs this argument, which assumes that Genesis is framed on strict ethnographic lines, which is disputable. Hence there is a very general, if not a universal, agreement among the more recent ethnologists that the Phoenicians belonged to the Semitic group of races. (Deutsch, Biblical Geog.; Jules Robert.) Unless historical grounds can be shown for the belief that a nation at some period of its existence changed its language, the form and type of its speech must be regarded as determining, almost beyond a doubt, its ethnography. Now the Semitic character of Phoenician language is indisputable. It is so closely akin to Hebrew that a moderate Hebrew scholar can understand it without difficulty. Gesenius first, and since his time Schroder and Reman, having subjected the extant remains to the most skilful analysis, have satisfactorily shown that Phoenician is predominantly and essentially Semitic, without traces of any non-Semitic form of speech. Next to Hebrew, its relations are most close with the Assyro-Babylonian form of the Semitic. See Semites (Vol. i. p. 310) and The Hebrew Language and Written Speeches of the Ancients.

Religion. — The Phoenicians were a people whose minds religion and religious ideas occupied a very prominent place. In all their cities the temple was the centre of attraction, and the piety of the citizens adorned every temple with abundant and costly offerings. The enumeration of the gods of the various states showed the greatest zeal in continually maintaining the honour of the gods, repaired and beautified the sacred buildings, and occasionally added to their kingly dignity the highly esteemed office of high-priest (Menand. Ephes. Fr. 1). The coinage of the country bore religious emblems, and proclaimed the fact that the cities regarded themselves as under the protection of this or that deity. Both the kings and their subjects commonly bore religious names—names which designated them as the worshippers, or placed them under the tutelage, of some god or goddess. Ab-adlomon, Abd-astartus, Abd-osiris, Abdi-milkut, Abd-esmun are names of the former kind; Abibael ('Baal is my father'), Ith'o-bal ('With him is Baal'), Balsezar ('Baal protects'), names of the latter kind. The temple observances were so numerous that it would be impossible to enumerate them. The worship of a number of gods was worshiped with the same rites and with the same observances. But, while we have ample evidence of the religiousness of the Phoenicians, the distinctive character of their religion still remains a matter of controversy. This arises, on the one hand, from the quaintness, jejuneness, and almost stereotyped character of the native notices, and, on the other, from the distorted and misleading account of the religion which has come down to us from a Hellenized Phoenician of the first or second century after our era, Philo of Byblus. A very less reliable and equally fallacious writer, 'that this writer, from whose work, disfigured as it is by his euhemerism, much more, we are told, may be gathered than some have supposed, if we only read it rightly. But it is exactly this necessity of reading into Philo what is not there that misleads the reader on his journey through the religious systems of antiquity. It is only when corralorated by other writers, or by the native remains, that Philo's statements have any value. The native remains show us that in the later historical times, for which alone they exist, the shrunken and localized form of the polytheistic nature-worship of a somewhat narrow character. There is reason to believe that, like so many other polytheisms, it had an earlier monotheistic stage. Of this stage
PHENICIA

the names Baal, El, El-Eholon, Rimmon, Molech, Adonai are traces (Max-Müller, Science of Religion, p. 171 et seq.). Another trace is found in the qinm names of Tyrian and Ashtoreth. Their glass was of three kinds, transparent colourless glass, translucent coloured glass, and opaque coloured glass, scarcely distinguishable from porcelain. The first they used chiefly for mirrors (Hlin. Hist. Nat. xxvii. 26); the second for beads, for imitations of gems, and inlays, jugs, vases, and amphorae, which are often of extraordinary beauty. Opaque glass was employed in statues and statuettes. The Phœnician purple dye was derived, principally if not entirely, from two shell-fish which were abundant in the Eastern Mediterranean, the Murc trunculata and the Murex brandaris. From these, even after careful treatment, a number of tints, varying from blue, through violet and purple, to crimson and rose, were produced, and, by different processes, rendered at once brilliant and permanent. With the purple-dye manufactories was closely connected the manufacture of textile fabrics, wherein the Phœnicians appear to have excelled. White wool from Syria (Ezek. xxvii. 18) and Arabia (ibid. ver. 21), flax from Egypt, and silk from Persia furnished the materials which were worked into stuffs of excellent quality by the Tyrian and Sidonian artisans, who, perhaps by dint of their skill in embroidery, obtained for these stuffs a precedence over the products of the looms of Egypt and Babylon. Phœnicia also manufactured on a large scale all manner of household utensils and implements, partly in clay, partly in metal, together with armaments of various kinds, for the purposes of the export trade which she carried on with barbarous and semi-civilised countries.

Navigation, Trade, and Colonies.—The Phœnicians appear as navigators in the earliest Greek (Hom. Odys. iv. 415—494), and in some of the earliest Hebrew (2 Chron. ii. 14) notices. They were regarded as familiar with the sea in times anterior to the Trojan war (Herod. i. 1). At first, no doubt, their navigation was timid and cautious. But after a time they became bolder. They sailed direct from headland to headland, and from their own coasts to the Euxine, and 70 miles down the Rhone, and even continued their voyages during the night, and after a while adventured themselves in the open sea, directing their course by the Polar star, which they found to mark approximately the true north in the seas to which they had to go. Their ships, though small, according to Polybius, well built and admirably fitted up and arranged (Xen. Econom. sect. 8). For trading purposes they employed ships of a broad, round make (γαδός), but in war they used galleys of a considerable length, which were ordinarily propelled by oars, the rowers sitting on a level, or else in two ranks, one above the other, or sometimes in three. The earliest representations of Phœnecian vessels which have come down to us are in the sculptures of Sargon and Sennacherib (circa 700 B.C.); those of the latter showing a double-tiered galley, which is certainly an established custom (Luc. De Den Syr., sect. 6; Enesch. Vit. Constant. Mag. iii. 55, sect. 3). The institution of the Galli carried out the same idea, and added a final degradation to a system otherwise sufficiently revolting.

Inventions and discoveries.—Two inventions connected with manufactures were especially claimed by the Phœnicians—the invention of glass, and the discovery of the purple dye. Glass is said to have been discovered accidentally on the Phœnician coast (see GLASS); but as the Egyptians had manufactured glass for many ages before, the Phœnicians occupied the Mediterranean coast, and as there was a very early trade between Phœnicia and Egypt, it is most probable that the Phœnicians borrowed their glass-making from the Egyptians. What was special to Phœnicia in respect of glass was the excellent quality of the siliceous coral, near So reconcile, which was called Balf. Their glass was of three kinds, transparent colourless glass, translucent coloured glass, and opaque coloured glass, scarcely distinguishable from porcelain. The first they used chiefly for mirrors (Hlin. Hist. Nat. xxvii. 26); the second for beads, for imitations of gems, and inlays, jugs, vases, and amphorae, which are often of extraordinary beauty. Opaque glass was employed in statues and statuettes. The Phœnician purple dye was derived, principally if not entirely, from two shell-fish which were abundant in the Eastern Mediterranean, the Murc trunculata and the Murex brandaris. From these, even after careful treatment, a number of tints, varying from blue, through violet and purple, to crimson and rose, were produced, and, by different processes, rendered at once brilliant and permanent. With the purple-dye manufactories was closely connected the manufacture of textile fabrics, wherein the Phœnicians appear to have excelled. White wool from Syria (Ezek. xxvii. 18) and Arabia (ibid. ver. 21), flax from Egypt, and silk from Persia furnished the materials which were worked into stuffs of excellent quality by the Tyrian and Sidonian artisans, who, perhaps by dint of their skill in embroidery, obtained for these stuffs a precedence over the products of the looms of Egypt and Babylon. Phœnicia also manufactured on a large scale all manner of household utensils and implements, partly in clay, partly in metal, together with armaments of various kinds, for the purposes of the export trade which she carried on with barbarous and semi-civilised countries.
PHOENICIA

with butz (probably cotton), and with embroidery and precious stones. Syria of Damascus gave the "wine of Helbon" and "white wool." Israel supplied corn of a superior quality, called corn of Minnith," together with pannag, an unknown substance, honey, balz, and oil. Arabia provided spices, as cashmere, musk, and sandal, aromatic reeds, together with frankincense, and perhaps cinnamon and laudanum. She also supplied wool and goats' hair, cloths for chariots, gold, wrought-iron, and precious stones, together with ivory and ebony, which she furnished imported from Assyria, Babylon and Assyria furnished wrappings of blue, embroidered work, and chests of rich apparel. Upper Mesopotamia partook in this traffic. Central Asia Minor, the home of Tuba and Meshech, supplied slaves and vessels of brass. Armenia gave horses and mules of a superior quality. There may have been some further land traffic with Egypt, since the Phoenicians had a settlement at Memphis (Herod. ii. 112), with Persia for silk, and with Central Africa for slaves and skins.

But the land trade of Phoenicia, extensive as we have seen it to have been, was far less than her maritime commerce. There may have been some further land traffic with Egypt, since the Phoenicians had a settlement at Memphis (Herod. ii. 112), with Persia for silk, and with Central Africa for slaves.

Phoenicia, extensive as we have seen it to have been, was far less than her maritime commerce. There may have been some further land traffic with Egypt, since the Phoenicians had a settlement at Memphis (Herod. ii. 112), with Persia for silk, and with Central Africa for slaves and skins.

But the land trade of Phoenicia, extensive as we have seen it to have been, was far less than her maritime commerce. There may have been some further land traffic with Egypt, since the Phoenicians had a settlement at Memphis (Herod. ii. 112), with Persia for silk, and with Central Africa for slaves and skins.
like; they assigned to each character a single definite articulation, and to each articulation a single definite character. They thus got rid of the immense multiplicity of earlier systems, and in- 
volved the beauty of simplicity which was transcendent that it has maintained itself ever since, and among civilised nations has superseded every other, having only received certain slight modifications. Their alphabet was invented by the Phenicians for business purposes, which re- quired it, and it was employed almost wholly for business purposes until a comparatively late date. The Phenicians proper, so long as they remained a nation, scarcely possessed anything that we should call a literature. They employed writing for short inscriptions on votive offerings, on tombs, and on coins, for curt records of the history of their country, or rather of their several towns, and no doubt for commercial transactions, but they scarcely wrote books or indulged in what we understand by the art of composition. One work on a philosophic subject (the atomic theory) is assigned to Melchus, a Soledan (Poinset, ap. Strab. vii. 2, sect. 22), and one on religion, or rather on cosmogony, almost certainly apocryphal, to San- chunniati, a Berytian. But otherwise Phenician literature belongs, not to Asia, but to Africa. The fragment of the Periplus of Hanno (q. v.), which contains certain geographical details, is found in Greek of the 4th century, and shows that the Liby-Phenicians at any rate could write interesting books of travels; and the Latin writers speak highly of Heniupael, Mazo, Hamilcare, and others, who had composed valuable works upon the history, geography, and 'origines' of Africa, and also upon ports, in Satull. B. J. xix. 17; Cic. De Orat. i. 58; Amm. Marc. xxii. 13; Solin. Polyhist. sect. 34).

Origin and History.—Two accounts have come down to us of the origin of the Phenicians. According to Herodotus, Strabo, Pliny, and others, they dwelt anciently on the shores of the Persian Gulf (Erythraean Sea), whence they crossed by land to Syria, and settled on the coast of the Mediterranean. Herodotus (vii. 89) declares this to be their own account of themselves, and Strabo saw at Ashkelon a similar inscriptions and monuments of the inhabitants of the gulf, who showed, in proof of it, Phenician temples on some of the islands. Justin, on the contrary, in his epitome of Trogus Pompeius, declares that they were driven out of their country by an earthquake, and passed to the Mediterranean from the Ebro to the Nile. This latter version of the story has been connected by some with the destruction of the Cities of the Plain recorded in Genesis. Whichever account be preferred, it would seem that the Phenicians regarded themselves as immigrants into their country, and not (like most ancient nations) as aboriginals. The settlements upon the Mediterranean coast were no doubt made by degrees, and the settlers at different places were, from the first, independent of each other. Among the earliest of the sites occupied were those of Sidon, Arka, Aradus, and Samsar. Tyre was the latest settled, the earliest settled was so considerably later, and Tripolis was a colony from Tyre, Sidon, and Aradus. Gebal, Akko (Acre), Berytus (Beirut), and Sarepta are mentioned, together with Tyre, in Egyptian inscriptions of the 14th century B.C. (Records of the Past, vol. ii. pp. 112, 113). It would seem about 1000 B.C. that 1300 Phenicia must have been a dependency of Egypt. But on the decline of Egypt under the twelfth dynasty the flourishing time of Phenicia began. Sidon especially grew to greatness, and became known as 'Great Sidon' (Josh. xiii. 18; xix. 28). Under her hegemony Akko, Acreh, and Aplek were able to resist the conquering Israelites (Judges, i. 31). She even at this time pushed her land dominion as far as Dan or Laish, on the head- 
waters of the Jordan (ibid. xviii. 7, 8). Her vessels traversed the Mediterranean, and she became known as the 'Queen of the Sea', the commercial power in the world, and as eminent in various branches of industry. At the same time she began that system of colonisation which Tyre afterwards pursued with so much success. Her emigrants occupied Cithaum and other places in Cyprus, the Egyptian islands, Malta, Uscas, and other places on the North African coast, together with many points in Sicily. She also endeavoured to extend her influence into Phönistia, and, after colonising Dor (SeylaJ, Peripha., sect. 104), made war on Asean. Here, however, she received a rebuff. Her colonies were nearly all burnt by a force under land, and so pressed the siege that the bulk of the citizens fled from the town by sea, and took refuge at Tyre (Justin. xviii. 3), which may thus have acquired her pre-eminence. Certainly in the second period of Phenician history (1592 to 877 B.C.) Tyre rather than Sidon takes the lead. The Tyrian colonies of Thassos, Abdere in Thrace, Proeuctus in Sithyria, Gades, Malaca, Sexti, Carteia, Belon, and a second Abdere in Spain, Caralis in Sardinia, Hudrumetum, and the lesser Leptis in North Africa, Tingis and Lixus on the West Coast of Africa, and Melitene, now Constantine, were founded by Carthage, which had succeeded the kingdom established by Saul and ruled by David (circa 1050) finds Himmon (Hiram) of Tyre a powerful neighbour, and enters into friendly relations with him. The friendship continues under Solomon, and both the Hebrew and the Tyrian annals (Dins., Fr. 2; Menad. Fr. 1) mention the communica- 
tions which took place between them. Hiram gave Solomon timber, and lent him workmen for both his palace and temple, receiving in return large annual payments in corn, wine, and oil, and ultimately obtaining a cession of territory (Gebal), which, however, he did not much value (1 Kings, ix. 10-13). The friendship led on to a participa- 
tion of Solomon in the Tyrian trade, both with Tarshish, or Tartessus, in Spain (ibid. x. 22), and with Ophir, perhaps the coast of Malabar (1 Kings, ix. 20; x. 11). Hiram reigned forty-three years, and governed besides TYA and Gebal, and Saron, and the isles of the sea, which he enlarged by subtractions and by uniting to it a separate island, besides adorning it with new temples, and probably with a new palace. He is thought to have also sent an expedition to Africa, and reduced the people of Utica to subjec- 
tion. Hiram also reigned forty-three years, from about 890 to 836. Balaczer, his son, who succeeded him, reigned seven years, from 836 to 829. Abd-Astuart, Hiram's grandson, then succeeded, and reigned nine years, from 829 to 820, when he was murdered by four of his foster-brothers, the eldest of whom took the throne, and reigned twelve years, from 920 to 908. He was succeeded by a monarch of the ancient stock, Astartus, who also reigned twelve years, from 908 to 896. Aserymus, a brother of Astartus, then mounted the throne, and reigned nine years, from 896 to 887, when he was murdered by another brother, Pheles, who, after a reign of eight months, was in his turn murdered by Ithobal, priest of Ashitareth, who held the throne for thirty-two years, from 887 to 335. Ithobal appears as Eth-baal, and is said king of Sidon 1 King. xviii. 26. He was the king of both cities. He gave his daughter, Jezebel, in marriage to Ahab, and was thus the means of introducing the Baal worship among the Israelites. The foundation of Botrya on the Syrian coast, north of Gebal, and the colonisation of Aliza in Numidia are assigned to him. He was succeeded by his son, Abdecor, who reigned six years, from 855 to 849, and then gave place to his son, Mattan.
PHcenicia

who reigned nine, or more probably twenty-nine years, from 849 to 820. At his death the crown fell to his son, Pygmalmion, a boy of eight or nine years old. A dispute, however, arose about the succession between his two uncles, Sicharbas (married to Pygmalmion's sister Elissa or Dido), and the result was Sicharbas' murder, and the flight of Elissa to the North African coast, where she founded Carthage, 814.

A foreign enemy began to threaten Phcenicia in the time of the late Assyrian monarchs, as Chededaomer and Tigrall-pileser I., had made no permanent impression on the Syrian region; but from the time of Asshur-nazir-pal (883-869) Assyria began a series of attacks upon all the tribes and nations in these parts, which resulted in their subjugation and submission to the Assyrian yoke. Asshur-nazir-pal, about 877, was the first to cross the Enuphates, enter the Orontes valley, and commence the conquest of the Syrian tribes. He received tribute from the Phcenician cities of Aradus, Gebel, Sidon, and Tyre. His son, Shalmaneser II., completed the conquest of Phceninia, defeating Mattai-Caal of Aradus, and compelling the other monarchs to a fixed system of tribute. The relations between Assyria and her vassal then continued peaceful for about a century (840-740). Assyria emerged 849, Phceninia was attacked, and the Phcenicians gladly paid their tribute and their homage in return for the protection afforded them. But about 740 a new policy was adopted. Tigrall-pileser II. was an active and enterprising prince, who energetically applied himself to the consolidation of his own independent monarchy. He began the process in northern Syria, rearranging the population in the various towns, taking from some, and giving to others, adding in most places an Assyrian element, appointing Assyrian governors, and requiring of the inhabitants the performance of service like the Assyrian (Eponyn Canon, p. 120, line 28). Among the places thus treated between 740 and 738 were the Phcenician cities of Sinywa and Arka. The result was a general awakening of distrust among the Phcenian populations. Sinywa and Arka revolted that same year, seeking to throw off the yoke of the Assyrians and to become a free state. Tyre, feeling the threat to her trade, took refuge under her kinsman the distant island of Cyprus. These movements provoked Assyria to action. About 727 Shalmaneser IV., the successor of Tigrall-pileser II., made an attempt to crush Elucines from the land side. Bluffed in this, he succeeded in detaching from the Firmian alliance a number of the minor Phcenician towns, and with the help of their fleets assaulted the island Tyre by sea. But the Tyrians defeated his attack, and he was compelled to withdraw and seek to force them to a surrender by cutting off their supply of water (see Joseph. Ant. 11. xix. 14, sect. 2). But they withstood him for five years, at the end of which the Assyrian monarch lost his throne by a revolution (722), and Tyre was for many years unmolested. At last, however, Sennacherib (cireis 721) felt the necessity of renewing the offensive, and having united against Tyre most of the other southern Phcenician cities, drove Elucines from his throne, and forced him to take refuge in Cyprus. A tranquil period then set in, but only to be followed by further revolts and subductions. In 680 Abil-Melkath, king of Tyre, who had taken the place of Abil-Melkath, joined Tirhakah against his suzerain (Eponyn Canon, p. 142, lines 12, 13), and was severely punished (ibid. pp. 144, 145); and about 645 Hosiah and Akko both revolted against Assar-bani-pal, the son of Esar-haddon, and were defeated, captured, and punished with utter destruction. This Tyranny of the Medes and Persians lasted so fairly in the 9th century, terminated in the 7th in a series of revolts, sieges, and massacres.

The Assyrian power came practically to an end about 633, and Phceninia found herself once more independent. Tyre, never submitted to, occupying the foremost place, and establishing a hegemony over the other cities (Ezek. xxvii. 8-11). But this prosperity and glory were short-lived. Within a brief space Phceninia, and Syria generally, became a bone of contention between Egypt and Phceninia, the two powers which made the earliest efforts to profit by Assyria's fall. First Egypt, under Necho (608), occupied the territory, and then Babylon, under Nebuchadnezzar (605), seized it. Tyre received a grievous blow at the hands of this latter prince, who, after a siege of thirteen years, forced the inland city to surrender to him. Phceninia remained a Babylonian dependent from 585 to 538, when Cyrus took Babylon, despite the efforts of the Egyptians to make themselves masters of it. A fragment of Memondes gives the internal history of Tyre during this interval. Her successors' external position appears, was a second Itholus, who reigned from about 597 to 573. He was succeeded by his son, Baal II., who held the throne for ten years, from 573 to 563. A revolution then took place, Cyrus overthrew the monarchy and placed by judges, others of a inferior status. Of these, Fishilael reigned for about 550, and finished, as he came to Carthage, between two, and Merbital and Gerastatus held it for six years (522-526). But now another internal struggle took place, and the monarchy was restored in the person of a certain Merbal, who was sent for from Babylon, a descendant of the ancient kings. This prince reigned four years, from 556 to 552, and was succeeded by his son, Hiram II., who had a reign of twenty years, from 552 to 552. It was in this latter period that the Babylonian empire came to an end, and Phceninia had another brief interval of independence (530 to 527).

The Babylonian was followed by the Persian period, which lasted from 522 till 333. Phceninia submitted to Cyperus, and became an integral portion of the Persian empire. In the arrangement of the provinces she held a place in the fifth satrapy, which was composed of Syria, Phceninia, Palestine, and Cyprus. She was allowed, however, to keep her native kings, and to organise for internal purposes an native government. Tyre, Sidon, and Aradus united themselves by federal ties, and sent representatives to a common council, which met at Tripolis. An excellent understanding was for some time maintained between the suzerain power and her vassal, who paid a yearly tribute. The period is noted for various maritime wars, forming the main element of her naval strength. It was Phceninia which crushed the Ionian revolt at Lade (495), which caused the failure of the Athenian expeditions to Egypt (478), and in which Cyrus was defeated by the Carthaginian. The Phcenician fleet, gave exceptional privileges to the Phcenian people and states. Phcenian were allowed to settle in Attica, particularly at Phalerum and the Piraeus, to erect tombs there, and have their own place of worship, while ultimately
subject are Mover's Die Phönizier und das Phönizische Altertum (1841-50) and Konrady's History and Inscriptions of Phoenicia (1881). It may perhaps be allowed to add his own History of Phoenicia (1889). There is a valuable article by Mover in the Encyclopædia of Erich and Gruber, and another by his brother in the Ridda, and some excellent essays on the principal characteristics of the Phoenicians, written by Emanuel Deutsch, will be found in his Literary Remains (1874). Recently the attention of scholars has been directed mainly to the three points of the geography of the country, the language and literary remains, and the artistic art and architecture. The geography has been largely illustrated by Pean in his Historie de la Phénicie, Walpole in his Anamurî (1851), by Tristram in his Land of Israel (1885), and by Lortet in La Sprte d'Aujourd'hui (1884). The language and literary remains, which engaged the attention of Gesenius towards the middle of the 19th century, were subjected by him to careful analysis in his important work, Scripturae Linguae Phoenicicae Monumenta (1837), which is still an authority of importance; but the work has since been further carried on with remarkable success by Judas, Études démonstratives de la Langue Phénicienne et de la Langue Lybique (1842); by the Abbé Bourdige Inscriptions Phéniciennes (1852); Dietrich’s Sardesie, by the late H. Weidemann; by J. Ewald, Erklärung der grossen Phönizischen Inschriften von Sidon (1856); by Schröder, Die Phönizisch Sprache (1869); and recently by M. Renan and other scholars in their magnificent Histoire de la Civilisation du Proche-Orient (Paris, 1881-90), where the Phoenician inscriptions occupy almost the entire first volume. Phoenician art and architecture have been largely discussed by M. Renan in his Histoire de Phénicie (1850), treated by M. Clermont-Ganneau in his work, L'imagier Phénicien (Paris, 1880), and by MM. Perrot and Chipiez in their magnificent Histoire de l'Art dans L'Antiquité (1877), where the subject of Phoenicia occupies the third volume. Biographies of Phoenician art have been pursued by General di Cossola in his Cypris (1877), and by his brother, A. d’El costola, in his Sosta (1892); also by Coccadi, Monumenta antiques de Cypris (1889); by Signor Carra di Sorro-ferri (Cagliari, 1875); and by M. de Vogüé, Milanges d’Archéologie Orientale (1890). Research is still going on upon Phoenician sites, as in the vicinity of Byblos and Sidon, and in Egypt and Syria, andweise and the Cyrenaica. The Bybdtal Journal Le Bechit contains from time to time interesting notices of the objects unearthed in Phoenicia proper, while accounts of the work done in Cyprus have appeared in the Times and elsewhere.

Phœnix, the name of a mythical Egyptian bird, supposed to be some to be a kind of plover, like the kible, often said to be associated with a druid in hieroglyphus velch. Others consider it to be the benun, or nytcccicum, a bird sacred to Osiris. It visited Egypt after the death of its father, and entered the shrine particularly dedicated to it at Heliopolis, and there buried its parent, putting the body into an egg or case made of myrrh, and then closing up the egg. Another account is that the Phœnix, when about to die, made a nest for itself in Arabia, from which a new Phœnix sprung of itself. This bird proceeded to Heliopolis, and there more buried its father. But the more popular-known version of schenon (1854), by M. A. d’El crossed all the Phœnix burned itself, and a new and young Phœnix sprang from the ashes. The Phœnix was, according to the most authentic accounts, supposed to visit Egypt every 500 years; the precise period, however, was not known to the Egyptians, and was a subject of contention till its appearance. The Phenician Phœnix was a bird of the theme, and all the Phenician period with that of the Sothic cycle appears to be generally received by chronologists, as well as the statement that it designated the soul and the incubation of the Nile. A great difference of opinion was prevalent about the Phenician period—a cycle generally of 560 years, excised also from 250 to 7000 years. Lepsius makes it a cycle of 1500 years. The Phenician was failed to have four times appeared in Egypt. For

Phœnicien, as in Asia, and where the Phœnicien art and architecture have been largely discussed by Mr. Renan in his Histoire de Phœnicie (1850), treated by M. Clermont-Ganneau in his work, L'imagier Phœnicien (Paris, 1880), and by MM. Perrot and Chipiez in their magnificent Histoire de l'Art dans L'Antiquité (1877), where the subject of Phœnicia occupies the third volume. Biographies of Phœnician art have been pursued by General di Cossola in his Cypris (1877), and by his brother, A. d’El costola, in his Sosta (1892); also by Coccadi, Monumenta antiques de Cypris (1889); by Signor Carra di Sorro-ferri (Cagliari, 1875); and by M. de Vogüé, Milanges d’Archéologie Orientale (1890). Research is still going on upon Phœnician sites, as in the vicinity of Byblos and Sidon, and in Egypt and Syria, andweise and the Cyrenaica. The Bybdtal Journal Le Bechit contains from time to time interesting notices of the objects unearthed in Phœnicia proper, while accounts of the work done in Cyprus have appeared in the Times and elsewhere.

Phœnix, the name of a mythical Egyptian bird, supposed to be some to be a kind of plover, like the kible, often said to be associated with a druid in hieroglyphus velch. Others consider it to be the benun, or nytcccicum, a bird sacred to Osiris. It visited Egypt after the death of its father, and entered the shrine particularly dedicated to it at Heliopolis, and there buried its parent, putting the body into an egg or case made of myrrh, and then closing up the egg. Another account is that the Phœnix, when about to die, made a nest for itself in Arabia, from which a new Phœnix sprung of itself. This bird proceeded to Heliopolis, and there more buried its father. But the more popular-known version of schenon (1854), by M. A. d’El crossed all the Phœnix burned itself, and a new and young Phœnix sprang from the ashes. The Phœnix was, according to the most authentic accounts, supposed to visit Egypt every 500 years; the precise period, however, was not known to the Egyptians, and was a subject of contention till its appearance. The Phenician Phœnix was a bird of the theme, and all the Phenician period with that of the Sothic cycle appears to be generally received by chronologists, as well as the statement that it designated the soul and the incubation of the Nile. A great difference of opinion was prevalent about the Phenician period—a cycle generally of 560 years, excised also from 250 to 7000 years. Lepsius makes it a cycle of 1500 years. The Phenician was failed to have four times appeared in Egypt. For

Phœnicien, as in Asia, and where the Phœnicien art and architecture have been largely discussed by Mr. Renan in his Histoire de Phœnicie (1850), treated by M. Clermont-Ganneau in his work, L'imagier Phœnicien (Paris, 1880), and by MM. Perrot and Chipiez in their magnificent Histoire de l'Art dans L'Antiquité (1877), where the subject of Phœnicia occupies the third volume. Biographies of Phœnician art have been pursued by General di Cossola in his Cypris (1877), and by his brother, A. d’El costola, in his Sosta (1892); also by Coccadi, Monumenta antiques de Cypris (1889); by Signor Carra di Sorro-ferri (Cagliari, 1875); and by M. de Vogüé, Milanges d’Archéologie Orientale (1890). Research is still going on upon Phœnician sites, as in the vicinity of Byblos and Sidon, and in Egypt and Syria, andweise and the Cyrenaica. The Bybdtal Journal Le Bechit contains from time to time interesting notices of the objects unearthed in Phœnicia proper, while accounts of the work done in Cyprus have appeared in the Times and elsewhere.

Phœnix, the name of a mythical Egyptian bird, supposed to be some to be a kind of plover, like the kible, often said to be associated with a druid in hieroglyphus velch. Others consider it to be the benun, or nytcccicum, a bird sacred to Osiris. It visited Egypt after the death of its father, and entered the shrine particularly dedicated to it at Heliopolis, and there buried its parent, putting the body into an egg or case made of myrrh, and then closing up the egg. Another account is that the Phœnix, when about to die, made a nest for itself in Arabia, from which a new Phœnix sprung of itself. This bird proceeded to Heliopolis, and there more buried its father. But the more popular-known version of schenon (1854), by M. A. d’El crossed all the Phœnix burned itself, and a new and young Phœnix sprang from the ashes. The Phœnix was, according to the most authentic accounts, supposed to visit Egypt every 500 years; the precise period, however, was not known to the Egyptians, and was a subject of contention till its appearance. The Phenician Phœnix was a bird of the theme, and all the Phenician period with that of the Sothic cycle appears to be generally received by chronologists, as well as the statement that it designated the soul and the incubation of the Nile. A great difference of opinion was prevalent about the Phenician period—a cycle generally of 560 years, excised also from 250 to 7000 years. Lepsius makes it a cycle of 1500 years. The Phenician was failed to have four times appeared in Egypt. For
PHONETICS

Phonetics, the science of the sounds of the voice. These are produced by air sent from the lungs through the windpipe, where it may or may not set in vibration two elastic membranes in the larynx, called the 'vocal cords,' producing 'voice' in the first case, and otherwise a wind-whistle called 'flatus.' After passing the larynx the voice or flatus enters the mouth (the cavity of which, variously modified by the tongue or lips, affects the sound by its 'resonance'), or else the nose (when the entrance to the same from the throat is not blocked by the pressure of the uvula against the back of the pharynx, greatly modifying the sound by the vibration of the complicated membranes which, in the nasal passages), or else both (as in the French nasal vowels). See VOICE, and the illustration of pharynx, uvula, &c. at DIGESTION. Properly speaking, phonetics comprehends the examination of many sounds which are not used in any language, and very different selections have been made by different nations. Here attention is confined to those used in 'received' (as opposed to 'dialectal') English, and a few other European languages.

As the sounds of speech are essentially differentiated by the variously shaped cavities of the mouth, two kinds must be carefully distinguished—'fixed sounds,' where the cavities remain unchanged during utterance; and 'glides,' where the forms of the cavities are constantly changing during the utterance. These glides necessarily occur in passing from one fixed position to another, and very often the fixed position is not used for the production of a fixed speech-sound, but merely for the beginning or end of a gliding sound. Thus, in pot, tok (Italics always indicate systematic writing), the e represents a certain fixed sound known as a 'vowel,' but the p, t, k represent only fixed positions which have absolutely no accompanying sound, and merely begin or end the (unwritten) glides on to and from the vowel. Hence they were called 'consonants' or 'with sounds,' even as much as they sounded with the vowel but not alone. The term 'consonant' has, however, now a much more extended meaning, and the above p, t, k are distinguished as 'mutes.' On the other hand, b, d, g, in bad, bag, have voice-sounds of their own, though very imperfect, and commence and finish the same glides as before, but they are also called consonants, and are distinguished as 'sonants.' Again s, sh, in sash, have distinct hisses of their own, which can be continued any length of time, but also determine glides, and are still called consonants, being distinguished as 'hisses.' Similarly th and f, in thief, 'thief,' are hisses and determine glides on to and from ec. In their there, 'they there,' the kh, are 'buzzes' which can also be continued indefinitely, but have a harsh, grating sound, and when in the same form (but otherwise) easily lose their voice and end in hisses, as hissing, 'his eyes.' The consonants nearest to vowels are the so-called 'liquids'—viz. the two 'flaps,' central r and lateral l, and the three nasals m, ng in roaring, toing, um, um, sung. These are very vowel-like that they can be actually sung upon, especially the three nasals which produce 'hums.'

It would seem to be an easy task to discover at least all the fixed sounds or positions capable of being produced by the organs of speech, and then, noting each by a symbol, leave the glides to form their connection. But it is not so; and had the invention of letters had to depend upon this discovery, we should still have been illiterate. Actually signs were invented for whole words, and then used for the sounds with which they commenced. All was very rough and rude, and the characters chosen could not have been readily altered, even had the requisite knowledge existed. Hence in all languages, and notably in English and French, though the intention of writing was to recall the sound, the word could only be symbolised into representatives of the component sounds, till it came to pass for the above two languages that a word seen and not heard could not be uttered, and a word heard and not seen could not be written. The purpose in this case is the avoidance of recasting orthography by strict analysis of the sounds—i.e. on a phonetic basis—and to print books in accordance with the new conception, in order to teach reading, at least in the first instance, to children and foreigners. These attempts are popularly spoken of as 'phonetics,' but they are only a practical and very small branch of it, to which it is not necessary to allude further. Some of these alphabets are adapted for the scientific expression of speech-sounds, and among them that here printed in italic letters and called 'Glosse,'
which will now be briefly explained and then considered somewhat in detail. The ordinary spelling is given in roman letters, the Glossic below it in Italic.

**SHORT KEY TO GLOSSIC.**

1. **Long stressed vowels** -
   - best, bair, baa, bought, boot, boot.
   - beet, ba'it, bow, ba'at, boot, boot.
   - With vowels - ba'it, ba'at.

2. **Short stressed vowels** -
   - kni, net, gnat, knot, not, nook.

3. **Short unstressed vowels** -
   - merry, parental, influence, follow.
   - mer'I, psar'til, in'foo'sa, fol'oa.

4. **Vowel diphthongs, unanalysed** -
   - file, fell, foul, fuel.
   - feil, foul, foul, feuil.

5. **Aspirate** -
   - hay, behave, mishap.
   - kai, bi-kai'I, mis-kap.

6. **Mutes and sonants** -
   - pea, bee, toe, toe, cape, gape.
   - pee' ber, toe' doa, kai' pi' gip.

7. **Hiess and Bozzes** -
   - whey, way, feel, real, thin then.
   - whai' kai, feel wheel, thin then.
   - seal real, rush rough, lee you.
   - seat zeet, rush roozh, you' soo.

8. **Flaps** -
   - ear' ring, hearing, gull struggle.
   - ear'ring, he'ring, gut strugl.

9. **Nasals** -
   - sum chasm, pan open, sung hunger.
   - sum law'm, pun' oop'n, sung' hung'ry.

10. **Consonantal diphthongs, unanalysed** -
    - chest fetch, jest, judge.
    - chek's fech', jest', juy.

Observe that long vowels under the stress have a turned period (·) after them, and that short vowels under the stress have a turned period after the following consonant. Unstressed short vowels are not particularly indicated here, otherwise than by the stress being marked on some other vowel, except in the ease of a.

The above scheme suffices for received English, but a few more signs, hereafter assigned, are required for some sounds in received German, Italian, Spanish, and French.

The difference between consonants and vowels is only one of degree. Both have their own special resonance cavities through which flatus, whisper, or voice can pass. But the vowel cavities are best adapted to allow the passage of clear smooth voice, capable of being sung upon with a good quality of tone, and the consonants are more adapted for 'hisses,' or that peculiar mixture of flatus and vowels known as 'buzzes.' The 'whisper' proper is a middle kind of sound for which the vocal cords are not brought perfectly close, but close enough to allow the extreme edges of the cords to vibrate in the breath passages, so that a mixture of obstructed flatus and imperfect voice results. Let any one pronounce the above key-words in lines 1 to 4 of the short key in a loud 'stage whisper,' and he will sufficiently seize the effect, which need not be further alluded to, except to draw attention to the difference between whisper and flatus, for the last of which the 'glootie,' or tongue-shaped cavity between the vocal cords, is as widely open as possible, and the sound is produced only by the wind-rush. The reader should try to speak line 1 of the short key with flatus.

The shapes of the resonant cavities of the mouth suitable for vowel-sounds have been analysed by Mr. Melville Bell for his 'Visible Speech' into nine kinds according as the back, middle, or tip of the tongue is high, mid, or low, reekoned from the lower jaw to the palate, the mouth in each case being wide open, and the nasal passages closed. Each of these nine can be modified by more or less closing the lips (called 'rounding'), doubling the former number. Again, each of these eighteen vowels may be either narrow or wide. The best phonetists are not yet agreed respecting the cause of this distinction, but its reality is certain, and may be readily perceived by comparing narrow 'bet' with wide 'bit,' narrow 'ba'it with wide 'beit,' narrow 'mawt' with broad 'not,' narrow pool 'wid' with pool 'pull.' By this means thirty-six vowels are obtained, which again can be varied in different ways. English has only twelve different vowels under the stress as shown in lines 1 and 2, and only four need be noticed when unstressed as shown in line 3. But this is a large number. Other languages have generally fewer, and this makes English so difficult for foreigners to pronounce. A few of the foreign vowels, however, present similar difficulties to Englishmen, among which are the following:

### Additional Vowels

| Short, as distinct from i in Fr. (French) and I. (Italian). |
|---|---|
| ae long in Fr. ba'et, 'bete'; Ger. (German) yeshprack'el, 'Gespäch.' |
| ao short in Ger. man'm, 'Mann'; Fr. aun'mos, 'anno.' |
| ah long and short, Fr. pah, 'pas,' a broad sound between ao and ru., but not rounded. |
| ao long and short or middle length, between ao and ru., Fr. mau'or, 'nord;' Ger. hau'tt, 'Holz.' Also used by older speakers in English as mau'or; now usually ma'oor, 'more.' |
| ee narrow in Fr. peo', 'peu'; Ger. Geot't, 'Goethe,' a narrow without vanish, spoken with the lips rounded as for oo. |
| eo wide, Fr. vor't, 'venve'; Gr. Bock,' 'Böcke,' a wide r, spoken with the lips rounded as for oo. |
| eu long and short, Fr. au'fear, 'affût;' set 'butte'; Ger. uf'lehr, 'über,' wep'lig, 'üppig,' a broad i (or, as Dr. Sweet thinks, a narrow ee), with the lips rounded as for oo. |

### The Four French Nasals

| eon' in raen,'vin,' an attempt to say oe or ou with the nasal passages fully open. |
| aan' or aun' in aan' or ain', 'san,' an attempt to say ae or ah with the nasal passages fully open. |
| eon' or aun' in boen' or bun', 'bon,' an attempt to say oen or oun with the nasal passages fully open. |

When two different vowels glide into each other they form a diphthong. Line 4 of the short key shows the four principal diphthongs purposely noted by arbitrary instead of systematic signs. If we wished to represent their analysis we would write fasl, fasl, fraul, fysoril, where the y and u are to be read as short unstressed, to be followed by the second element, the first element being short but stressed. In the cases of 'way,' 'know,' and similar words, especially in the pause, it is very usual in the south of England to let the voice glide off to a y and sound known as the 'vainting,' but yet not quite so strong as way'y, now.' There are, however, a number of 'murmur diphthongs' where the second element is the murmurr, into which the flap r degenerates (in London, not in Scotland), as shown for ui
in line 8 of the short key, or in the four usual cases—e'z, or e, 'ear, e'zair; ao or ao, 'ear; p's or p's, 'poor.' The r, however, revives if a vowel follows, as he'e, hee'ring, 'hear, hearing, p's or p's, pour, pouring; or p's, p's'ring, more commonly in London.

The name in which a vowel begins to sound is called a 'glottid,' because it depends upon the opening of the glottis. If the vocal cords are quite close and ready to act, as they should always be in singing, the vowel-sound commences immediately on the breath reaching the larynx, and this is called the 'clear' glottid. If the closure of the glottis be exaggerated, so that the vowel comes out with a kind of explosion, the result is the 'catch' glottid, written (') in discussions. This is common before all vowels beginning words or compound parts of words in German, as mae'nyu, ser'tin'brown, 'el'me Erinnerung.'

On the other hand, if the glottis is not quite closed at first, but closes gradually as the breath passes, we have first a slight escape of flatus, followed by a slight whisper, and then by the vowel itself. This forms the 'gradual' glottid, which is not uncommon, especially in passing from a hiss to a vowel, as in see; and even from a mute to a vowel, to distinguish more clearly mutes from sonants, as pes from bee. As a general rule none of these three glottids need be marked, though the 'gradual' may be distinguished in phonetic discussions by ('), as pes, pes'. A similar effect called the 'recoil' occurs after mutes in the pause, and may be written in the same way in discussions; compare pop' with pop'gun, not pop'gun. An exaggeration of this (') often occurs in the so-called 'aspirate' or 'rough breathing,' which essentially consists of a jerked emission of breath, whether voice or flatus, and the exertion of jerking out a vowel often introduces a strong flatus through the vowel position. Both are represented by k (or, when not initial, to prevent confusion, by -k'), but in discussions the latter may be represented by h', as hot, hot.'

The sonants which have positions that gradually diminish in the power of allowing distinct voice to pass from the nasal liquids, as n, through the lateral liquid 1, the flap r, the buzzes, as z, and hisses, as s, to the sonants, as d, and the mutes, as p, may be arranged either as in the short key or by the parts of the vocal organs which form the passage (putting, however, the mutes first as most marked by absolute stoppage of voice) as in the table, where capitals refer to the short key, and the other letters are explained afterwards.

**TABLE OF CONSONANTS.**

<table>
<thead>
<tr>
<th>LIPS</th>
<th>TONGUE MID.</th>
<th>TONGUE BACK.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ADDITIONAL CONSONANTS.**

Col. 2. f', v are f, v without touching the teeth, and of these w is the regular German 'v.' Both occur in modern Greek and Hungarian.

Col. 5. 'd', 'd', 'n' are the common continental forms of our d, t, s, the tip of the tongue being brought more forward, so as to lie fully against the gums. The first two occur dialectically sometimes before r, but are not received. They need not be distinguished from d, t, s, except in discussions.

Col. 6. sh' or sh' pronounced without the hollow at the back of the tongue, which is more in the n-position. But the distinction need not be made except in discussions.

Col. 7. sh are the flapped voiceless forms of s. The first occurs universally in the Welsh 'll,' and the latter dialectically in English for initial 'kn' in 'know.'

Col. 8. 'iy', 'iy' are attempts to pronounce i and a at the same time as y, and hence different from iy, iy in mil'yan, mif'gan, 'million, mine,' where the y follows. They occur as 'ig, gn, in Italian 'gillo, segno, 'igyon, milyan, and Spanish 'el, 'la.

The iy, although still written as 'ill' in French, has of late been replaced in speech by simple y, but ny remains as 'gn; thus, 'allem, 'singer, 'signor, 'signer, etc.

Col. 10. ky, gy are attempts to utter k, g at the same time as y, and used to be heard (may still occasionally be heard), as in 'eart or eart, by the Welsh 'll, and the latter dialectically in English for initial 'kn' in 'know.'

Col. 11. kY, ky are the hissed and buzzed forms of ky, gy in German seck' or secy'k, see'k, 'sich stage,' but ky gY are considered by some (even German) phonetists as the same as y, yh, seck' or see'k.

Scotland. It is the Spanish 'l,' sometimes 'x' or 'tse,' before e, i, as e'kha, keke'shu, 'khus, 'hijo, Quizote, ge'-lef).

'r,' 'r' are flaps made with the uvula instead of the tip of the tongue; 'r' is common in Northumberland, in north France, and in north Germany, where also 'r' is found in the pause, as in 'rily'bi'k, 'richter.'

Col. 12. k'e, q'u' arise from an attempt to utter w at the same time as k, q, and kw', gw' are the corresponding hiss and buzz in German 'auk' or 'auk,' 'zauk' or 'zauk,' 'lauchen, laugen.'

This table is of course very incomplete, but it will serve as a framework for introducing other consonantal sounds. The glides are all these sonants to and from all the vowels should be carefully studied in actual words, but cannot be considered here.

Speech consists of sentences, and it is only by careful analysis that these are separated into words, syllables, glides, and fixed sounds, so that the letters which represent the last only, and have here been treated first, are determined with much difficulty among the mass of sound heard. Any one who attempts to write an unknown language from pure dictation, without seeing its usual writing (if it have one), will feel this immediately. And from this mass of sound to disentangle the words, as they are usually separated, is still more difficult.
An attempt has been made by Dr Sweet for English (Elementarbuch des gesprochenen Englisch, Leip., 1886, and Primer of Spoken English, Oxford, 1890), and by M. Paul Passey for French (Les Sons du Français and Le Français parlé, both 1889), to write exactly what is spoken, dividing the words, commas, etc., by a system of phonetic spelling, and a study of these books will show the difficulty of the problem. The Existing Phonology of English Dialects (1889), by the late Dr Ellis, the writer of this article, shows an attempt to write all English dialects, practically previously unwritten dialects, surfaces, and very difficult it was found, the alphabet here given being quite insufficient for the purpose. For a fuller account of phonetics, reference may be made to his Speech in Song (1878), in which this alphabet is used. See also the articles in this work on ALPHABET, CRIME'S LAW, LETTERS, SHORTHAND, VISIBLE SPEECH, VOICE.

To show the nature of phonetic writing, this rapid sketch of the subject may be concluded with a rough attempt to write received English in the educated colloquial form used in London (not in Scotland).

Example of Phonetic Spelling.

Ab's-fa'ah-le, ei-in-too'a, dâtth-tât: neu'y-br'ah'ah te-on'a'ul Jau'm'ul fu'ul tood'be'en, r'iich is grooitin ni-rih'dah pan pa'ah'el, co'ul to'dar'rih le'rih, moush-k'hih, musk-lih-fah'ah-neer about 'tw-tw, au-mo'lah, in-length th-dahy, un'se sam mi'abap' is skwering aw ur-ti-tud'lah lo-st'se zuhokok vi-tah cuhji: for eir ke-rin'oul tood'ur'rih rai' ah in kree'li-wurk dih'mo'lah, in-mo'lah-di down ak'wuh-ril of-ril, siu-rih-mo'lah in'on'ah'lah in'ah'i-wurk le'mo'lah, in o'mo'sh leh-nin'in, lihning yah, lenning-a der-plee'do' ma'no'ing n'tah-lah lej-ko'ah, poesi'n rai'n.

In ordinary orthography.

Ah! father, I am sure, that that new branch of our country's favourite woodbine, which is growing near the post not far from the north wall of the garden, must be safe from frost, on account of its length to-day, unless some mishap is occurring or it has suddenly lost its usual vital energy; for I have carefully observed its rate of increase every week this month, and noted it down accurately on your slate, and I know it has experienced no variations, barring one, during a desperately nanomigious interval of time, pouring rain.

Phonograph, an ingenious instrument for mechanism recording and reproducing human speech, song, &c. The phonograph was invented by Mr T. A. Edison (q.v.) in the spring of 1877, at his Menlo Park Laboratory, New Jersey, and came to existence as the result of one of the many long series of experiments he was engaged upon. Following up some of his telegraphic inventions, he had developed a machine, which by reason of the indentations made on paper, would transfer a message in Morse characters from one point to another literally, through the agency of a tracing-point connected with a circuit-closing device. Upon revolving with rapidity the cylinder that carried the indented or embossed paper Mr Edison found that the indentations could be reproduced with immense rapidity through the vibration of the tracing-point. He at once saw that he could vibrate a diaphragm by the sound-waves of the voice, and, by means of a stylus attached to the diaphragm, make them record themselves upon an impessible substance placed on the revolving cylinder. The record being made thus, the diaphragm would, when the stylus again traversed the cylinder, be thrown into the same vibrations as before, and the actual reproduction of human speech, or any other sound, would be the result. The invention thought out in this manner was at once tried, with paraffined paper as the receiving material, and afterwards with tinfoil, the experiment proving a remarkable success, and the first phonographs being ready to be sent to Mr Edison in America and Europe, and attracted universal attention. The records were made in these on soft tinfoil sheets fastened around metal cylinders. For a while Mr Edison was compelled to suspend his invention, but soon returned to it and worked out the machine so as to exist practically to-day. It occupies about the same space as a hand sewing-machine. A light tube of wax to slide on and off the cylinder is substituted for the tinfoil, which had been wrapped around, and the indenting stylus is replaced by a minute engraving point. Under the varying pressure of the sound-waves, this point or knife cuts into the tube almost imperceptibly, the waxedelled away wreathing off in very fine spirals before the edge of the little blade, as the cylinder travels under its guidance. It has been possible to record about one thousand words. In the improved machine Mr Edison at first employed two diaphragms in 'spectacle' form, one to receive and the other to reproduce; but he has since combined these in a single efficient attachment. The wax cylinders can be shot through with the usual bellows or by being fitted with a small paring tool which will shave off the record previously made, leaving a smooth new surface. The machine has also been supplemented by the inventor with an ingenious little electric motor with delicate governing mechanism, so that the machine can be regulated at any chosen rate of speed, uniformly. This motor derives its energising current either from an Edison-Lalande primary battery, a storage battery, or an electric-light circuit.

The new and perfected Edison phonograph has already gone into very general use, and hundreds of thousands are distributed in American business offices, where they facilitate correspondence in a variety of ways. They are also employed by stenographers as a help in the transcription of their shorthand notes. New and improved phonographs have been slowly dictated to announcers, but they are now frequently read off to a phonograph, and then written out at leisure. The phonograph is, however, being used for direct stenograph work, and it reported verbatim 40,000 words of discussion at one convention held in 1890, the words being quietly repeated into the machine by the reporter as quickly as they were uttered by the various speakers. A large number of machines are in use by actors, clergymen, musicians, reciters, and others, to improve their elocution and singing. Automatic phonographs are also to be found in many places of public resort, equipped with musical or elocutionary cylinders, which can be heard upon the insertion of a small coin; and miniature phonographs have been applied to dolls and toys. The value of the phonograph in the preservation of dying languages and idioms, for which it has been especially adapted, is manifested by the fact that records have already been secured of the speech, songs, war-cries, and folklore of American tribes now becoming extinct. It is also worthy of note that several voice records remain of distinguished men, who 'being dead yet speak.' Their tones can now be remembered, and, however they may now be lost, and speech can be repeated, they are still, and faithful in accent and individuality, can be heard again and again through all time.

Improvements are being made in the wholesale reproduction of phonographic cylinders, by electrotyping and other processes; and the machine, in a more or less modified form, is being introduced as a
Phosphorescence

Means of furnishing a record of communications through the telephone. Phonographic clocks, books, and other devices have also been invented by Mr Edison, whose discovery is evidently of a generic nature, opening up a large and entirely new field in the arts and sciences. See also TELEPHONE.

Phonography. See SHORTHAND.

Phonolite. See CLINKSTONE.

Phormium. See FLAX (NEW ZEALAND).

Phosphates. See PHOSPHORUS, MANURE.

Phosphatic Diathesis. In Medicine, designates the condition in which there is a tendency in the Urine (q.v.) to deposit white gravel.

Phosphorescence. Strictly speaking, the term is applied to the phenomenon, exhibited by certain bodies, of remaining luminous in the dark for some time after being exposed to a strong light. Certain preparations, such as calcium sulphide (see LUMINOUS PAINT), indurated limestone, &c., possess this property in a very high degree. With the great majority of phosphorescent bodies, however, the phenomenon is very short, rarely more than a small fraction of a second. Bequerel, who studied this phenomenon with great care, invented a very ingenious instrument for the purpose, called a phosphoscope. The body to be tested is placed in a small drum, which has an opening at each end. In this drum there revolve two discs, mounted on the same axle, and pierced symmetrically with the same number of holes. They are so adjusted that when a hole in one disc is opposite to the hole in the corresponding end of the drum, the light of the luminous body at the end of the drum, and vice versa. Light is admitted by one of the holes in the drum so as to fall on the object, and it is examined through the other hole. It is obvious that, when the discs are made to revolve, the object is alternately exposed to light and prevented from it. By a train of revolving wheels, these alternations may be made to succeed each other as rapidly as the observer pleases, and thus the object is presented in the dark to his eye as soon after its exposure to light as may be desired. Almost all bodies are found to be phosphorescent in quinine and certain other highly visible liquids, but in the blue and indigo spaces a strange change of colour is at once apparent where the liquid has been spread. This appears more strongly in the violet, and vividly in the spaces beyond the violet, where rays fall which excite no luminous sensation in the eye, and a certain indistinct visible length of the spectrum may easily be doubled. By using the electric light, which is peculiarly rich in these highly-refrangible rays, a prism of quartz, which allows them to pass very freely, and various fluorescent substances, Stokes has obtained spectra six or eight times as long as those otherwise visible. The characteristic of all these rays is that they are less refrangible than from which they are produced. The entire phenomenon is, as Stokes first showed, identical in principle with Leslie's photometer, in which light was measured when changed into heat by absorption in the coloured glass, of which one of the bulbs of his differential thermometer was formed. Ordinary phosphors (from which the phenomenon took its name) become luminous in the dark by slight friction; whereas the common trick of drawing self-luminous figures on doors and walls with a stick of phosphorus, or an ordinary Lucifer match wetted.

Phosphorescence in Organic Beings.—The emission of light by minerals after insolation and the cognate phenomena of luminosity on heating, friction, cleavage, crystallisation, &c., are of quite different nature from the production of light by organisms, the special subject to which we now turn.

Luminosity due to Interaeaction or to Decay. The fact that many organic substances (especially fish) become luminous when decaying has long been known, and has often been erroneously attributed as the chief cause of the phosphorescence of the sea. It is only quite recently that the discovery of luminous bacteria has led to any general explanation of these facts, and even yet its wide applicability remains to be proved. They have been shown to exist in several instances which will be mentioned below, and the constant association of these low forms of life with phosphorescent processes is suggestive enough to warrant the conclusion that luminosity under such circumstances may be due to their presence. Perhaps they may also account for the few instances in which the human body has been recorded as phosphorescent during life.

Luminosity due to Havana Light.—(1) In the vegetable kingdom the instances of the occurrence of this property are but few, and the majority of these belong to the algea and fungi, the bacilli or bacteria above mentioned being referable to the former. Most of the fungi are Hymenomycetes (Capsaeae, spp.); in some cases the mycelium (root-like threads) gives out the light: in others, as in A. olearius, not uncommon at the roots of olive-trees, it is the under surface of the mushroom-like head. The light is only seen while growth is progressing; it ceases so soon as the fungus is mature. A more or less accurate light is emitted by mosses, grasses, a Euphorbia (E. phosphorea), a Lily (Lilium bulbiferum), a poppy (Papaver orientale), and a masturium (Tropaeolum majus) have all been recorded as luminous. The last instance is worthy of notice as having been observed by the daughter of Linnaeus in 1702.

(2) In the animal world there is not one of the larger groups, up to and including the fishes, which does not afford some good examples of this phenomenon. A complete list of these would be outside the scope of such an article as the present; it must suffice to mention some of the best instances in each class, indicating briefly the nature of the photogenic mechanism. Among the Protozoa the small sphaeroidal Noctiluca militaris is perhaps the most widely spread instance of this property, this organism, or others allied to it, emitting light at certain times around the coasts of the greater part of the world. The light is emitted from the general protoplasm of the body; a pocket-lens shows some points to be brighter than others, whilst a higher magnifying power shows these regions to be groups of very similar forms. Among the Porifera (sponges) the only recorded luminous form is the larva of a species of Reniera. The poverty of this class is,
PHOSPHORESCENCE

The common hydroid colony *Obelia geniculata*, often growing upon the fronds of Laminaria (sea-tangle), is a familiar instance. Numerous Medusae (jelly-fishes) must be added to the list; and here the light is variously emitted in different parts of the organism; (a) from the marginal coruscations; (c) from the radial canals; (d) from the ovaries. Sometimes the same genus includes both luminous and non-luminous forms. *Nemaphora* (sea-pens) furnish instances of the possession of this property; such as *N. excrucians* (Long Island) and on other parts of the Scottish coast, and Pennatula, the subject of classic researches by Panceri, where the light emanates from eight bands or tracts of specially modified tissue situated in the wall of the stomach.

A few species of Ophiurids (brittle stars) and the small pelagic *Phyllorhiza buechula* is of importance, because of the transparency of its tissues permits of its easy study and the successful localisation of its luminosity, which is found to reside in nerve ganglia, as well as in certain small rounded cells situated at the ends of the nerve twigs. The rock-boring bivalve (Pholas) is one of the longest known instances of animal phosphorescence, being recorded by Pliny, who noticed that if any one chewed the animal the whole cheek would glow; though it is now probable that this form the light is emitted from five definite patches all situated within the mantle cavity—(1) an are corresponding with the anterior margin of the mantle, (2, 3) two triangular patches near the opening of the branchial siphon, (4, 5) two long parallel bands within the same siphon. The luminous material is secreted by the epithelial cells covering these portions of the body, and has been shown to consist essentially of two substances, a white crystalline body (luciferine) and a ferment (luciferase); by the mixture of these two in a test tube it is possible to reproduce it without the presence of living matter. The ferment is most likely produced by a certain bacterium, which occurs in large numbers in small pits in the walls of the siphon.

Observations upon baccilli as the cause of phosphorescence have also been made on Crustacea of the genera Talitrus and Orthoplia (sand-hoppers) in a state of disease; the malady, and the consequent luminosity, can be transferred to healthy specimens by inoculation, and the germs can be cultivated by the same method. It would appear that the sand-hoppers infest themselves with the baccilli from dead fish on which they habitually feed. Many other Crustacea, however, are luminous under normal conditions, as, for instance, some Copene (Sapphirina), and more particularly the Schizopoda, one of which, Nyciphanes norvegica, is not uncommon in the deep waters of Loch Fyne as well as on the Norwegian coast. Definite organs (phosphophorina) are here present for the production of light; one in the stalk of each eye, one at the root of each first, and one at the root of each penultimate, thoracic limb, and one accompanied by a large, luminous, and rounded organ in the abdomen. Each organ, as has been proved by microscopic sections, is in reality a miniature half-eye lantern, equally well in complexly by the organs of certain fishes. Several phosphorescent Ascidians are known, the most conspicuous being the pelagic *Ciona*, which has an ovoid external shell, and the animal zoolid has two rounded luminous organs. The researches of the recent deep-sea expeditions have revealed quite a number of phosphorescent fishes, with specialised organs of many different types. Some of these appear to be glindular, whilst others are optical instruments of great complexity, with spherical and paraboloid reflectors to send the light in definite directions and with lenses to concentrate it. In some of the abyssal *Lophiophis* (angler-fish) the modified dorsal fin-ray which acts as a lure has a phosphorescent extremity, no doubt to render it more attractive.

There still remain for consideration the phosphorescent insects, which belong almost exclusively to the Hemiptera (longs) or the Coleoptera (beetles). To the former belong the lantern-flies (Fulgora and allied genera), though it must be mentioned that the possession of this power by these insects has been denied by more than one good observer. Luminous beetles appertain to the families Lamyridae and Elateridae. The glow-worm (*Lampyris specularis*) and the Italian firefly (*Luciola italica*) are good examples of the former, and have been often described as luminous. In both these types are situated in a certain number of the posterior segments of the abdomen, consist of two layers, of which the dorsal contains large quantities of uric acid salts, and the ventral clear cells, which are arranged in cylindrical lobules. In some species both sexes are luminous, in others only one. In the Mexican firefly or Cruyos (*Pyrophorus noctuera*), which belongs to the Elateridae or click-beetles, the organs are three in number, one in each upper and hinder angle of the prothorax, and one much larger occupying the centre of the ventral surface of the abdomen. The organ is invisible while the insect is at rest, but shines forth when it spreads its wings and raises its abdomen in flight. Both the eggs and larvae of this species are luminous.

As regards the physical peculiarity of the light, it varies in colour in different cases, being blue in the mycelium growing in rotten wood, in Cumina, Beroé, Pyrosoma, and Lampyris; green in a species of Agaric, *Pteroclesid*, in Ophiurids, and in *Pyrophorus*; yellow in *Noctiluca*, *Bolu* and with a reddish tinge in a species of *Cestum*, purple in *Punulesis*, but at night blue. In *Noctiluca*, *Oxytella atlantica* and an Appendicularia observed by Giglioli it has been stated that the light varies in color. In all cases in which the matter has been investigated the spectrum has been found to be continuous; the amount of heat given off in phosphorescence with the process seems to be quite infinitesimal, though actinic rays have been shown to be present. The phenomenon would appear to consist in a definite vital process which, in these cases, lends to the production of radiant energy just as other instances to the evolution of heat and electricity.

The uses of this property to its possessors may, so far as is known at present, be grouped under four heads: (a) It enables the sexes to find each other, as in *Lucila* and earthworms; (b) it is possessed by so many stinging *Ctenolentes* that
in them we may fairly regard it as a warning signal, and it may have been adopted by stingless forms for the same purpose by mimicry; (c) it may serve to attract prey, as in the phosphorescent lure of the deep-sea angler-fish (Melnocetus, &c.); (d) it may illuminate the surrounding regions and enable the living phosphorescent forms to swim as in P. ystophorus, Nectyphantes, and many deep-sea fish. So many deep-sea animals are possessed of luminous qualities that it has been assumed that these living lights play an important part in the economy of life in these regions; this hypothesis is confirmed by the discovery of phosphorescent matter in the form of Coprolites (q.v.), or the dung of extinct animals, and more rarely as wavelite (phosphate of alumina) and vivianite (phosphate of iron). In many volcanic rocks vivianite is found in minute crystals or particles, and by the decomposition of these rocks it passes into the soil. From the soil it is extracted by plants, which accumulate it (especially in the seeds of the cereals) in quantity sufficient for the wants of the animals which supply food. In the animal system phosphate of lime forms 57 per cent. of the bones; phosphates of iron in the alkaline fluids of the blood; and in the animal fluids; and in fibrin, albumen, and nervous matter phosphorus is universally present, although we do not clearly know in what form of combination it occurs.

Phosphorus was originally discovered in 1669 by Brandt, a Hamburg chemist, who obtained it from urine. Gahn and Scheebe were, however, the first to discover its presence in bone, and to employ that material for its preparation. The following are the leading steps of the method now usually employed in obtaining it on the large scale. Bones are burned to white ash, and the latter is then mixed with sulphuric acid in such quantity as to decompose the phosphate of lime occurring in the ash, Ca$_3$(PO$_4$)$_2$, partly into insoluble sulphate of lime, partly into a soluble superphosphate of lime, whose composition is represented by the formula $\text{H}_3\text{Ca}(\text{PO}_4)_2$. The solution of the superphosphate is evaporated to a syrup, mixed with charcoal, and submitted to distillation in an earthen retort exposed to a red heat. Phosphorus rises in vapour, and is conveyed by means of a bent tube into water, in which it condenses in yellow droplets. Two distinct processes take place within the retort. The first consists in the decomposition of the superphosphate of lime into bone-earth and hydrated phosphoric acid; while the second consists in the deoxidation, by means of the carbon, of the liberated phosphoric acid into phosphorus—a process accompanied by the evolution of carbonic oxide gas. After being pressed in a fusible state through wash-leather, and further purified, it is forced into tubes, in which it is allowed to solidify, giving it the usual form of sticks. Sombreroite (see APATITE) is now largely substituted for bones in the manufacture of phosphorus.

Phosphorus forms two known oxides—phosphorus anhydride, $\text{P}_2\text{O}_3$, obtained by the slow oxidation of phosphorus in dry air; phosphorus anhydride, $\text{P}_4\text{O}_{10}$, obtained by the combustion of phosphorus in an excess of dry air or oxygen. The latter is a snow-like substance which has a great avidity for water, and is therefore very useful in the laboratory as a desiccating agent.

Phosphorus forms five acids—hypophosphorous acid, $\text{H}_3\text{P(O)}_3\text{H}$, monobasic (the anhydride, $\text{P}_2\text{O}_5$, is not known); phosphoric acid, $\text{H}_3\text{P(O)}_4\text{H}$; phosphorus acid, $\text{H}_2\text{P}_2\text{O}_5$; and phosphorus acid, $\text{H}_2\text{P}_3\text{O}_8$. Phosphorus acid, $\text{H}_2\text{P}_2\text{O}_5$, obtained by dissolving $\text{P}_2\text{O}_5$ in water or by heating ordinary phosphoric acid to redness; pyrophos-

374
Photius, Photius of Constantinople at a critical period, was a member of a patrician family of Constantinople, and was born in the early part of the 9th century. Distinguished by his abilities, he served in various important public offices, and secured the favour of the Emperor Michael and his powerful favourite Bardas. The patriarch Ignatius, having in vain tried to correct the vices of the profligate emperor, was banished, and Photius, though a layman, was appointed in his stead, hurried in a few successive days through all the stages of sacred orders, and finally installed as patriarch. Two successive councils of bishops under court influence confirmed the deposition of Ignatius and the election of Photius. In 882, however, Pope Nicholai 1. (q.v.) called a new council at Rome, which declared Photius' election uncanonical and invalid, deposed and excommunicated him, and reinstated Ignatius in his see. Being supported, however, by the emperor, Photius retained possession of the see, and called a council at Constantinople in 867, in which he raised a controversy of doctrine and discipline between the churches of the East and West themselves. In all these doctrinal differences the council condemned the Western Church, excommunicated Nicholas and his adherents, and withdrew from the communion of the see of Rome. Michael being put to death by Basilius the Macedonian in 867, Photius was banished to Cyprus, and Ignatius reinstated; and in 869 the eighth general council, at which Pope Adrian II.'s legates presided, was assembled at Constantinople. Photius was again condemned and excommunicated, and the intercommunion of the churches restored. Yet on the death of Ignatius Photius was reappointed to the patriarchate. In 879 he assembled a new council at Constantinople, renewed the charge against the Western Church, and excommunicated the creed in the article, 'the Procession of the Holy Ghost' the word filioque (see Spirit). The separation of the churches, however, was not completed till the time of Michael Cerularius (see Greek Church). Photius was finally deposed, and exiled to Ararat in 885. He was afterwards pardoned by Michael, and died soon afterwards, probably in 891. His chief remains are Myriobiblon, called also Bibliotheca, a summary review of 279 works which Photius had read, many of which are now lost; a Lexicon; the Nomocanon, which is a collection of the acts and decrees of the councils and ecclesiastical laws of the emperors; several minor theological treatises; and a collection of letters, many of them extremely interesting and elegant. See Hergenrother's monograph on Photius (1869).

Photography, the art of producing pictures by means of the action of light on sensitised surfaces. Its origin is as ancient as the science to which it belongs, and was the monopoly of the alchemists of the 16th century that Vauque Cornet or Horn Silver (native chloride of silver) was blackened on exposure to light, as the first chemical step in the history of photography, while the formation of photographic copies was laid by Della Porta in the invention of the camera obscura (1569) at a somewhat earlier period. This property of chloride of silver, and also the darkening of nitrate of silver by light in the presence of organic matter, constitute the leading facts on which the science of photography is based. In 1777 the famous Swedish chemist Scheele found, by experiment, that Horn Silver was blackened quickest at the violet end of the solar spectrum, thus proving that the rays of light are not all alike chemically active. A quarter of a century later Ritter of Jena demonstrated the existence of chemically active invisible rays beyond the violet rays of the spectrum.

The honour of being the first to produce pictures by the action of light on a sensitive surface is now very generally conceded to Thomas Wedgwood, an account of whose researches was published in 1802 in the Journal of the Royal Institution, under the title, 'An Account of a Method of copying Paintings upon Glass, and of
making Profiles by the agency of Light upon Nitrate of Silver; with Observations by H. Davy.' The misfortune was that no attempts made either by Weiglond or Davy to prevent the uncoloured portions from exposing the plate, which we now say, to fix the picture) were successful.

Niepce Niepe of Châlon-sur-Saône was the first to enjoy the satisfaction of producing permanent pictures by the influence of solar radiations. This was accomplished in 1814, and the name chosen to denote such substances, which devoured the sun's rays, consisted of coating a piece of plated silver or glass with asphaltum (bitumen). The plate so prepared was then exposed in the camera obscura for a length of time, varying from four to six hours. Wherever the light acted it rendered the asphaltum insoluble in its usual solvents, and the lights were represented by the insoluble asphaltum remaining on the plate.

Daguerre appears to have begun in 1824 the experiments which eventually led to the discovery of the daguerreotype process. On Daguerre learning that Niepce was working in the same direction as himself, the two formed a partnership in 1829. The discovery of the Daguerreotype (q.v.) was announced in January 1839, though the details of the process were not made public till August of that same year. It consists in exposing a metal plate covered with iodide of silver for a suitable time in a photographic camera, the plate being afterwards transferred to a dark room, and exposed to the vapours of mercuric iodide, which changes the latent image into a positive. It was then dipped in a solution of nitrate of silver, which is changed by the action of the common salt into the chloride of silver, some of the nitrate, however, remaining unaltered. Paper so treated is sensitive to light, so that when a fern-leaf, for example, is placed close down upon two plates of glass, and daylight is allowed to act on the prepared surface, the paper-blackens except where it is covered, and thus a reversed picture of the leaf on a black ground is obtained. This was then placed over another sheet of paper, prepared in the same way, and the light allowed to act through it. Another picture of the leaf was thus produced, but this time with its lights and shades the same as in nature. The white image on a dark ground was called by Fox Talbot a negative, and the print from it he called a positive. These terms are still current in photography; the negative image being produced in the camera, as the first and leading operation—any number of positives being obtainable from it on paper, glass, or any other material capable of forming a support for a photographic image. The Calotype process was patented by Talbot in 1841. In this process Talbot produced his negative by preparing paper on the surface with iodide of silver, subsequently washing it over with a mixture of nitrate of silver, with gallic and acetic acids, and then exposing it in the camera to the object he wished to copy. The invisible image or picture thus obtained was developed by acetate-nitrate of silver and gallic acid. The paper negative was then rendered translucent with wax, and used for the production of many positives in the way described above. The introduction of collodion by Archer marked the next great step in photographic progress, and this, known as the wet-plate process, is now almost universally used.

Photographic Apparatus.—The most important piece of apparatus used by the photographer is a form of the Camera Obscura (q.v.), generally called simply a camera, with its attached lens that throws the image on a glass plate or horned sheet of paper. It consists of a box to enable it to be sharply focussed. A thin flat box with a shutter, together called a dark slide or 'back,' contains the sensitised plate. When the picture is focussed the screen is withdrawn and the 'back' inserted in its place; the shutter is then drawn out, and the sensitised plate, which exactly occupies the place of the glass screen, being now exposed, receives the picture. In a brief time, which nowadays varies from a fraction of one to several seconds in a good light, the shutter is closed, and the slide returned to a room illuminated by a light not chemically active, generally red, orange or yellow green, where the plate is taken out and developed.

The introduction of dry plates for photography, which may be used in the camera a long time after their preparation, has had a great influence in modifying apparatus and rendering the photographic process almost true of the photographic camera. Under the older system (wet-plate photography) the plate had to be used immediately after it had been coated and furnished with its sensitive film, or it became useless. Once dried, however, the plate could be stored during exposure was therefore all that was necessary, for only one plate could be prepared and used at a time, a dark room or tent being necessary for the operations. But now that the plates will keep almost indefinitely between preparation and use, any convenient number can be made ready for insertion in the camera, to be exposed to the action of the light one after another. For this purpose what are called double dark backs are employed, each holding two plates—one on each side, and each side being furnished with a light-proof shutter which can be opened to allow the lens to cast the image on the plate inside as soon as the back is fixed on the camera.

Much ingenuity has been applied to camera construction of late years, but, although many new modes of carrying the plates and bringing them under the influence of the rays have been devised, the double-back system, as just described, is the one most generally adopted when glass plates are employed. Various changing-boxes have been devised, which contain a dozen or more plates, and dispense with all but one dark slide, that is constructed to receive and discharge any plate of the series at will. Hare's changing-box is the one most generally known. This has a special form of dark back, which can be charged with one plate from the box at a time, and is then inserted in the camera for the exposure. Recent improvements in photographic apparatus have been largely adopted whereby the camera itself becomes a storage for the plates, a simple mechanical arrangement permitting the exposed plate to fall to the bottom while another plate occupies its place.

But the most recent change in photographic apparatus is due to the introduction, or rather the revival, of sensitive films supported, not on glass, but on a flexible material. We have already seen that Fox Talbot employed paper for his negatives; and, although paper was superseded by glass when the collodion process came into existence, photographers were quick to recognise that such a brittle material had serious disadvantages. Many experimenters endeavoured to produce or find some
PHOTOGRAPHY

material which, while possessing the transparency of glass, should be of a less brittle nature, and among these Mr Woodbury in 1876 produced such a compound from collodion, castor-oil, and Canada balsam. This mixture, after being heated to a temperature on a sheet of paper sensitive to light, and after again being dried was stripped from its support and cut into suitable sizes for the camera. It is noteworthy also that the inventor at the same time proposed that such films, being perfectly flexible, might be wound and unreel on the same cabinet as that containing the camera; and thus, the long roll of sensitized film might be submitted to the luminous image, and thus the whole business of changing plates be accomplished by the turn of a handle outside the apparatus. The same idea was taken up by Warnecke a few years later, and his patented roll-slide became obtainable commercially. Warnecke also made a sensitive dry collodion film for use in his apparatus, but its cost—which was at the rate of a penny per square inch—limited its use to a few.

To Messrs Morgan & Keil of Richmond belong the honour of being first to apply gelatine to photographic sensitiveness. The paper is now made by many dealers, and is commonly called bromide paper. Its principal use is for enlarging, but at the time of its introduction it was used for negative work, the paper being rendered semi-transparent by an alkaline agent or gum arabic. In any case, too, after the work the inventors employed a roller-slide of the kind suggested by Woodbury. The Eastman Company next took up the matter, introduced a roll-slide, together with a paper film of very reliable quality. This paper is sold in spools, and is known as the Eastman paper; the buyer had merely to take a spool from its case, insert it in the roll-slide, and he immediately had material ready for reeling off forty or fifty negatives, to be subsequently separated by cutting, developed, and rendered transparent with a preparation of vaseline. These films have been described to be made on account of the trace of grain from the paper which was left on the picture printed from it, and a 'stripping film' was next adopted as previously proposed by the Rev. W. Palmer. By this modification the surface bearing the image could be stripped from the plate and retransferred to sheet paper, insoluble gelatine, which became its final support. Film photography has recently been brought to still greater perfection by the employment of transparent and flexible celluloid in sheet form. It is curious to note that this substance, invented by Parkes, was long considered as an inefficient substance for use in photography, and it would doubtless have been so used if collodion, when applied to it, had not had a solvent action. But as it is quite insoluble in water, it forms a perfect support for a gelatine film, and now that it can be manufactured nearly as clear as glass, it represents the best thing yet introduced. Its general use is limited by its cost, which is greatly in excess of glass, but it presents so many advantages that it is very largely employed. The material is now made thin enough to be wound on spools and used in roll-holders. Beyond the advantage of lightness, portability, freedom from breakage, reduced cost of carriage, &c., which the films undoubtedly possess, there is one gain in their employment, of a technical nature, which is important enough to receive recognition here. They are free from halo- tions. Having a surface that approximates very closely to that of glass plates as an encroachment of the light parts upon the dark portions, and is seen in its most aggravated form in the blurring out of windows in interior views. It is caused chiefly by reflection of light upon the glass.

The great rapidity of modern dry plates allows a photograph to be taken in such a mere fraction of a second that the camera can be held in the hand during the operation. Various hand-cameras are now made, and meet with extensive employment, especially by tourists, and are more or less dismissed by experienced men; but they are becoming so common that the disagreable is more apparent than real.

The extreme sensitiveness of modern dry plates has also given rise to what is known as flash-light pictures, which are photographs taken by the aid of an instantaneous flash produced by scattering powdered magnesium into a lamp-flame. Many ingenious forms of lamps have been devised for this purpose. They mostly consist of a spirit-lamp in conjunction with a receptacle for the magnesium powder, with a pneumatic ball and tube attached. Pressure on the ball distributes the powder, and carries it into the flame. This system is much used for taking groups and portraits at night in private and public rooms. The best workers employ a branch tube from the ball, which exposes the lens at the moment of maximum light. Lens combinations designed for this purpose is of great importance. An explanation of the different forms and properties of Lenses is given under that head, but it is necessary to say a few words here about the kinds used in photography. They may be divided into two classes—portrait and landscape lenses. The portrait lenses cover a large aperture, but give a small image; while the latter have a small aperture, but give an image which covers a far larger surface. In the portrait lens rapidity of action has been the chief thing considered, for it is used in a studio where the amount of light available is always more or less limited. A portrait lens unless of the 'doublet' form is not suitable for view purposes; but a view lens can well be used for portraiture under certain conditions, and is one of the best lenses to use for groups. Under the head of view lenses come a large number which have fanciful names attached to them that are apt to mislead the tyro, but which are all more or less alike. In the early days of photography telescopic objectives were made to do duty in the camera, but they gave a very small field, and were in other respects unsuited to the purposes of photography. The Petzval lens, designed by Petzval, and made by Voigtländer of Vienna, an invention which marks an era in photographic progress. The single view lens, which is the cheapest and for pure landscape is still unequalled, had its first improvement in the patent granted to Dallmeyer who placed a meniscus lens made by Grubb in 1857. Although called a single lens, it consists of a combination of crown glass of concavo-convex form, cemented to a flint divergent meniscus. The single lens was modified later on by Dallmeyer, who subsequently, in 1888, introduced a new form of view lens which, possessing the usual advantages, had the quality, hitherto unknown in a single landscape lens, of giving an image free from enurlinmal distortion. The same feature had been secured by Dallmeyer in his well-known triplet lens, which was invented in 1860, and which, as its name implies, consisted of three combinations. This lens was serviceable for copying, architectural subjects, as well as for landscape, and was a great favourite with photographers. It has now been superseded by the doublet form of lens, which, under the name of rectilinear, symmetrical, &c., is the most commonly used form of photographic lens. It possesses two positive and two negative combinations of similar construction placed with their concave surfaces facing one another, the necessary stops or diaphragms for increasing definition and reducing spherical aberration being inserted in a slit in the brass mounting tube midway between them. These lenses are constructed to take different angles of view, according to the require-
ment of a given case: for taking subjects in a confined situation, such as a narrow street, or for depicting the façade of a large building at very limited range, a ‘wide-angle’ lens is necessary. For the convenience of those carrying a number of lenses, Heinrich Oskar von Studnitz invented a kind of non-removable lens that will fit all flange. Every lens is fitted with a set of diaphragms or stops; and, in the case of the lens last mentioned, these usually take the form of a rotating plate, pierced with the necessary apertures. But in other lenses the diaphragms are in the form of separate plates, and are kept in a small leather case by themselves, the operator removing any of the series, and inserting it in the lens when wanted. These diaphragms are marked with what is known as their focal value, which means that the number marked represents the fraction which the aperture of the diaphragm is of the focal length of the lens. To make this plain, let us suppose that the focal length of the lens is 6 inches, and that the diaphragm in question has an aperture of a quarter of an inch. As there are in 6 inches 24 of such quarter inches, the figure 24 will represent its value, and this will be expressed thus: 24. In like manner, a half-inch diaphragm would be marked $\frac{1}{12}$, and a one-eighth inch diaphragm $\frac{1}{48}$.

There is, however, another method of marking lens stops, which has been adopted by the Photographic Society of Great Britain, and which is called the ‘Uniform Standard,’ or U.S. for short. In this system $\frac{1}{4}$ is called No. 1, and the U.S. number for any other size is found by dividing the focal length of the lens by the diameter of the stop, as already described, squaring the result, and then dividing by 16. Of late years a remarkable improvement, which, however, had for some time been applied to microscopes, has been made in photographic lens diaphragms, in a contrivance which, from its resemblance to the natural diaphragm of the eye, which expands or contracts automatically according to the amount of light to which the organ is subjected, is called the iris diaphragm. This consists of a number of flat blades or tongues of thin blackened metal, which are preferably to be used in the lens mount. By a turn of this ring the blades are expanded or contracted, so that the aperture can be enlarged or diminished as required, while a scale marked on the outside of the lens mount, and a travelling pointer, indicate the focal value of every change of aperture. Wet negatives on glass, and occasionally on leather or in lens manufacture—the introduction of aluminum instead of brass for the necessary metal work, by which the weight of the instrument is greatly reduced. The same useful metal, only now rendered available by its cheaper manufacture, is also coming into use as a substitute for brass in the other metal fittings of cameras. A new kind of glass, known as Jenia optical glass, is now being employed in the construction of photographic lenses. By its use a larger field can be covered with a given aperture than was the case under former conditions.

Wet-collodion Process.—Collodion (q.v.) is the name given to the solution of pyroxyline, a kind of gun-cotton, in a mixture of ether and alcohol. When this is flowed over a glass plate it gradually dries and adheres to the plate. It was first produced for photographic purposes in 1851 by Mr. Scott Archer, and has been of great and important service. For nearly a quarter of a century the wet-collodion process was almost exclusively practised by photographers—in the earlier years for the production of positives on glass, and occasionally on leather or other non-fragile materials; latterly by modifications the process was more extensively employed for the production of negatives. Dry-collodion processes have also been in use, although on a much more limited scale. These are the stages in the wet-collodion process: (1) A glass plate made perfectly clean is coated with collodion, to which the bromide of cadmium and either iodide of potassium or iodide of ammonium is added. The coated plate is ‘sensitised’ by immersion in a bath of nitrate of silver, containing 33 grains to every ounce of distilled water. (2) Production of latent image by exposing the sensitised plate in the camera after the object has been focused. (3) Development of latent into visible image by flooding the plate with a solution of sulphate of iron (ferrous sulphate), or of pyrogallic acid, to either of which some acetic or citric acid is added. (4) Fixing of the permanent image by immersion of the plate in some solvent of those parts of the sensitive surface upon which the light has not acted. This solvent for wet plates is cyanide of potassium, but for modern processes hypo sulphite of soda is employed.

Dry-plate Processes.—It is hardly necessary to do more than name a few of the earlier dry-plate processes; since, a number of dry plates have all been beaten out of the field by the recent one known as the gelatino-bromide process. Several advantages arise, especially for field-work, from using dry sensitive plates. With the wet process the operator, when away from his studio, must keep his plates in a dark tent, or dark, and developing agents, besides a supply of water for washing purposes; but these impediments are not required with dry plates. Dry-plate processes are of two principal kinds: (1) Those in which the collodion is applied to the glass plate, and afterwards sensitised in the silver bath, as in the wet method, but with a ‘preservative’ such as albumen ‘flowed’ over the surface, and the plate allowed to dry. (2) Emulsion processes, in which the sensitive silver salt is held in suspension in the collodion or gelatine. A good emulsion can be prepared by adding some soluble bromide, such as bromide of cadmium, to the collodion, and afterwards an alcoholic solution of nitrate of silver. The glass plates are simply coated with this emulsion, washed in water to remove the soluble salts, and set aside to dry, when they are ready for use. The gelatin-bromide emulsion process is still employed to a limited extent, chiefly for the production of transparencies; recent experiments indicate that it may yet compete with gelatino emulsion in sensitiveness.

The earliest form of the gelatino-bromide process, at present so universally employed, appears to be due to Dr. Maddox, who published the details of a workable emulsion of this nature in 1871. The process was improved in 1873 by Mr. Bennett, and again in 1878 by Mr. Charles Bennett. It was found that if the emulsion was kept at a temperature of 90° F. for some days, or boiled for half an hour, the sensitiveness of the plate coated by it was so greatly increased that a view which could only be taken formerly in 30 seconds could now be taken in one. A very sensitive gelatino emulsion can also be formed by boiling a solution of gelatino and a solution of silver. Dry plates produced by some form of the gelatino-bromide process are now manufactured on a large scale. When properly made they will keep good for years, and they can be developed months after having been exposed. But it is generally admitted that the emulsion products obtained when the plates are not old, and when development follows exposure without undue delay.
PHOTOGRAPHY

the paper was salted only—i.e. the albumen was dispensed with—and this old method is being largely revived.)

(2) Silvering of the paper by floating it on a solution of silver, from 30 to 60 grains of this substance being used for every ounce of water, according to the amount and kind of chloride in the paper. It is afterwards dried.

(3) Exposure to light. The silvered paper is exposed beneath the negative in a printing frame, the place of exposure varying according to the brightness of the light and the character of the negative.

(4) Toning. In order to give a pleasing colour to the print it is usual to tone it in a solution of chloride of gold. Quite recently the metal platinum has been used for toning silver prints on plain paper with very fine results. One method has been introduced by Blanchard, and another by Lyonel Clark, the latter employing the same salt, the chloro-platinite of potassium, which is used for the platinum printing process to be presently described.

(5) Fixing. The print, when taken from the toning bath, is steeped in a solution of hyposulphite of soda, which removes the undarkened silver salt that is still sensitive to light, and so fixes the image.

(6) Washing. Silver prints require to be washed quickly and fairly long treatment with the hyposulphite of soda. Prolonged soaking is harmful, and imperfectly washed prints soon spot and fade. Gelatino is now largely coming into use as a substitute for albumen: it is more suitable for the rendering of delicate detail, and the prints with it can be exposed in their production ought to be more permanent. The papers known as Aristotype, Argentotype, and Celerotype are gelatine emulsions of chloride of silver spread on paper.

Printing in Salts of Iron.—The metal iron in some of its chemical preparations is now very largely employed in a number of photographic printing processes—e.g. cyanotype, chrysotype, kallitype, platinitotype, &c.—and is capable of producing results with all the fidelity and delicacy of the silver process, in some cases at considerably less cost, while the manipulations are greatly simplified. The principle involved is next to be considered as known as ferric salts, that are not affected in appearance when certain other chemicals are brought in contact with them; other preparations of iron, known as ferrous salts, produce highly-coloured pigments when combined with these same chemicals.

The action of light can change ferric into ferrous salts; hence, if a piece of paper be coated with a ferric salt, dried, and placed under a fern leaf, a piece of lace, or a photographic negative, and exposed to light, an image in a ferric salt is produced which is capable of being developed into a highly-coloured image when acted on by a suitable reagent; and not only so, but, as this reagent has no action on the ferric salt, they may be mixed together in the first instance and thus applied to the purpose when the action of light will develop the highly-coloured image, a simple wash in water completing the operation. This is in outline what is known as the Cyanotype or Blue printing process, first published by Sir J. F. W. Herschel in 1842, which in detail is as follows:

The cyanotype is made on a support containing sixty-four grains of ammonio-citrate of iron to the ounce of water, the other forty-eight grains of ferrocyanide of potassium to the ounce of water. Mix equal quantities of these solutions, and with a soft sponge or flat camel-hair brush quickly and evenly cover one side of good smooth white paper. This is best done by gas or candle light; then place to dry where it will not be affected by daylight. Then paper so prepared is chiefly used for copying plans and drawings on tracing cloth: the tracing, which should be in a good opaque black ink, is placed on top of the paper, and both are covered with a second sheet of cyanotype paper. Ten minutes in a very bright light will suffice for exposure. The print is now washed, when the lines of the drawing will appear white on a blue ground. The same kind of paper can be exposed beneath a photographic negative in order to secure a rough copy of the picture, but in this case the time of exposure is much increased.

A disadvantage of the above process is that the original black drawing on white paper appears as a white drawing on a dark-blue ground.

The following modification, known as the Pollet process, produces blue prints on white paper: Gum arabic, 25 parts; common salt, 3 parts; perchloride of iron, 8 parts; tartaric acid, 4 parts; and water to make up to 100 parts. Well-sized paper is coated with the above and treated as in the preceding; it is not sensitive to light. A good tracing on bright sunlight is sufficiently printed in from ten to fifteen seconds. The print is developed by immersion in a saturated solution of ferro-cyanamide of potassium (yellow prussiate), and the design immediately appears in blue. The print is now rinsed in cold water, and then transferred to a 10 per cent. solution of oxalic acid: a third rinse in cold water completes the operation.

Chromotype.—This is a modification of cyanotype, also published by Sir J. Herschel. The paper is merely coated with the ferric ammonium citrate, and may be developed after exposure with a neutral solution of gold chloride, washed with water and dried. The resulting print is in metallic gold in a finely-divided state, and is of a fine purple colour. A dilute solution of nitrate of silver may be substituted for the gold when the image is in metallic silver.

Kallitype.—In this process paper is washed with a strong solution of neutral ferric oxalate. After printing in the usual way, it is developed by the following solution: Nitrate of silver, 50 grains; citrate of potash, 500 grains; bi-chromate of potash, 1 to 2 grains; rain water, 500; ammonia, 2 parts. The precipitate is next dissolved by the addition of ammonia (strength, 85°) about a drachm will be sufficient. After filtering add 35 drops of strong nitric acid, and the developer is ready. This solution is very cheap and easily prepared. The resulting prints possess a fine rich black effect.

Platinitotype or Platinum Printing Process.—The metal platinum can be deposited from some of its chemical preparations in an extremely fine black powder when brought in contact with one of the iron salts altered by light. Herschel explained how to get prints in platinum, but the process now employed is that discovered by Willis. Captain Abney, F.R.S., thus describes the chemical action upon which the process is based: 'Mr W. Willis, jun., found, that he could obtain an image in platinum black, by means of development, if he sensitized his paper with ferric oxalate, with which was mixed a solution of chloro-platinite of potassium. The action of light on this paper is to reduce the ferric salt to the ferrous state, and when the ferrous salt is in solution the platinum salt is reduced by it. By floating the exposed paper in water on a solution of ferrous oxalate, which is a solvent of the ferrous oxalate, the platinum salt in contact with it is immediately reduced to the metallic state, and an image is thus built up. To fix the prints they are immersed in dilute hydrochloric acid, which dissolves away any ferric oxalate there may be, and also gets rid of any oxalate of lime.'

Paper prepared as above described is supplied com
mercatorially. And after being exposed to light beneath a negative in a printing-frame for about one-third of the time necessary in the case of a print on silivered paper, its lemon-yellow tint is found to change, where the light has reached it, to a pale, dirty-gray colour. Development is conducted in an iron enamelled tray, beneath which a spirit-lamp has been placed to keep the sodium chloride solution at a temperature of about 175° F. Under-exposed prints will benefit by this temperature being exceeded, whilst those which have received more light than they should have had can be advantageously treated by the non-development of telling the other faults of the paper. The print is floated on this warm bath, which turns the faint image of the picture to a dense black, and fixation follows by placing the picture in a series of water baths made slightly acid with hydrochloric acid; these remove the iron from the paper; a simple rinse in plain water completes the operation. The developer can be mixed in bulk, for it keeps well, and the same quantity will develop a large number of prints one after the other. The platinum prepared paper will keep well if damp be excluded. For this reason it is so greatly preferred to silvered paper over an equal quantity of calcium chloride, a salt which is so greedy of moisture that it will absorb all in its neighbourhood. The favour with which this process has been received, because of its permanence and its quick results, is well indicated at photographs. Indeed, no other process has the pictures shown invariably platotypes. Mr Willis, the inventor, has introduced a cold bath platinum process, in which the metallic salt is contained in the developer, and this modified method is said to present many advantages. The developer thus prepared not only hardens the photographic image, but also may be mixed to meet the existing demand. Another modification of the platinum process, made known by Willis, but more generally associated with the name of Captain Pizzelli, yields a dark image in the printing-frame. The only necessary after-treatment is a bath of weak acid, followed by washing in plain water. There is every reason to suppose that platinum will be the printing process of the future, but unfortunately the price of the metal, which in 1890 was 100 per cent. calculated for the present to limit its use.

Bichromated Gelatine Process.—So far back as 1839 Mungo Ponton announced that paper steeped in bichromate of potash and dried changed its colour when exposed to light. It was subsequently discovered that soluble parts of the composition of the bichromate, but also oxidises the size (gelatine) of the paper. Gum, starch, and allum were also found to become, like gelatine, insoluble when exposed in contact with the bichromate of potash or ammonia to the action of light. If ordinary gelatine be soaked in cold water, it absorbs the water and swells, and then if heated, or if hot water be poured on it, the gelatine melts. If some bichromate of potassium or ammonium had been added to the cold water, the gelatine would re-precipitate the chemical along with the water. If now the gelatine be dried, and then heated until the stain imparted by the bichromate is altered in colour, it will no longer swell in cold water, neither will it dissolve in hot water; the action of light has made the bichromated gelatine insoluble. The principle of this chemically modified that we owe the 'autotype' or 'carbon'—more correctly 'pigmented gelatine'—process. The Collotype, Woodburytype, and some forms of photocoloured engraving and photogravure, also certain kinds of 'phantom' photographs, and one method for vitreous enamels, depend on the same principle.

The Autotype, Carbon, or Pigmented Gelatine Process.—Pigmented gelatine paper is an article of commerce, and the Autotype Company supply this 'tissue' sensitised ready for printing. The tissue consists of a thick coat of gelatine, with which has been intimately mixed a certain amount of permanent pigment in very fine powder—for if a black, Indian ink be used on gelatine; other colours are added to modify the tint. The gelatine is sensitised with ammonium bichromate, and then exposed under a negative till it is supposed to be sufficiently printed. The image is not visible as in a silver or iron print, therefore some indirect plan of exposure, such as the use of an actinometer, must be resorted to. The change which takes place in the gelatine film is this: the surface next the negative has been rendered insoluble wherever the light has acted, and that to a depth corresponding to the intensity of the light. It results from this that almost the whole of the surface of the gelatine has been rendered insoluble—to the greatest depth where the light has acted most strongly. Soluble portions, however, remain enclosed between its surface and the paper. No picture is visible till these are removed; for over a certain distance (a tenth of an inch or so) from the surface the removal of the soluble portions imprisoned between the insoluble skin and the paper at the back—took many years of experimenting, and all sorts of devices were resorted to. One plan was to expose the back of the tissue to the negative, thus taking the cutout image still leaving the paper showed offensively. Farguez spread the pigmented gelatine on glass, exposed it thus under a negative, and then coated the film with collodion. On subjected the whole to the action of warm water, the latter penetrated the collodion and the pigment was washed out of the glass, being held together by the collodion. This was now supported on paper (collodion side down), and washed from the back with warm water, and so the first half-tone photographs in pigmented gelatine were obtained.

Swan experimented on similar lines, and in 1862 he took out a patent for pigmented gelatine films spread upon collodion supported on glass. When dry the whole was stripped from the glass, and thus the first tissue was made. The difficulty of removing the cutting paper, although at present, and this Swan overcame by coating the collodion surface of his tissue with India-rubber solution, and applying it to a piece of paper similarly coated. When both were dry the whole was passed through a press, and then soaked in warm water; thus the bit watters on the picture in which leaving part of the film acted on by light untouched, and projecting in relief according to the varying action of light as it passed through the gradations of the negative. By this method and a subsequent modification Swan sent out a number of fine pigment prints, but it was so troublesome, expensive, and unsatisfactory in the hands of the average photographic printer that printing by bichromated gelatine never became popular until J. R. Johnson, about the close of the year 1868, discovered that the pigment could be removed after sensitisation by the bichromate and correctly exposed to light under a negative, only required to be soaked in cold water, and then evenly applied to any surface impermeable to air, such as glass, zinc, oilcloth, etc., when the gelatine surface would be printed. The principle of the schoolboy's sucker—by atmospheric pressure alone. Then by soaking in hot water the paper at the back came off, carrying with it much of the matted pigment and gelatine, and by laying the image remaining on the support with the hot water the picture in all its delicate gradations appeared clean and perfect. It was this.
PHOTOGRAPHY

discovery that made what is generally known as autotype or carbon printing a practical working process. The method above described is called the single transfer process, and produces a print reversed as to right and left. The double transfer process merely differs in the adoption of a temporary support of opal glass, zinc, or paper coated with a suitable preparation (the most convenient being Sawyer’s flexible support), which holds the print till developed, and from which the print is then transferred to its final support—it is then non-reversed. When practicable it is usual to take a reversed negative, and thus avoid the double transfer.

Powder Process.—By what is called the powder process prints are produced on paper in phlogosilphg, or any other impalpable powder insoluble in water. It has been a good deal used on the Continent. A slightly sticky or ‘taeky’ preparation of sugar, gum, glycerine, and potassium bichromate, when exposed to light, loses its stickiness in proportion to the intensity of the light acting on it. A glass plate coated with this preparation will therefore, when exposed under a negative, represent the picture, so to speak, by breaking up into tiny fragments, and these fragments of powder, when washed, adhere to the surface of the glass, and give a picture. This kind of powder is made by taking a very thin layer of a metallic oxide, between two glass plates, and crushing the metallic oxide between the plates by pressure. In this way a layer of metallic oxide is obtained, which is then transferred to a glass plate, and when this plate is placed on a support, and exposed to light, the metallic oxide is decomposed and reduced to metallic minute particles, which adhere to the glass plate, and are washed away and dissolved in water, leaving an impression of the negative. This process, however, is too slow, and the method of making the metallic oxide as described is too cumbersome. It is more convenient to make a metallic oxide by evaporating a metallic salt solution on a glass plate, and then exposing this plate to light. In this way a layer of metallic oxide is obtained, which is then transferred to a glass plate, and when this plate is placed on a support, and exposed to light, the metallic oxide is decomposed and reduced to metallic minute particles, which adhere to the glass plate, and are washed away and dissolved in water, leaving an impression of the negative.

Photographic Enamels on Glass and Porcelain.—If the image as described in the preceding paragraph be developed by suitable metallic oxides —such as the underglaze colours of the porcelain paper—coa, the resulting image coated with colloid gelatine, and then coated with a light-sensitive metallic oxide, such as copper, zinc, or any other metallic oxide, will become visible when exposed to light. The light-sensitive metallic oxide becomes decomposed, and is reduced to metallic minute particles, which adhere to the glass plate, and are washed away and dissolved in water, leaving an impression of the negative. This process is too slow, and the method of making the metallic oxide as described is too cumbersome. It is more convenient to make a metallic oxide by evaporating a metallic salt solution on a glass plate, and then exposing this plate to light. In this way a layer of metallic oxide is obtained, which is then transferred to a glass plate, and when this plate is placed on a support, and exposed to light, the metallic oxide is decomposed and reduced to metallic minute particles, which adhere to the glass plate, and are washed away and dissolved in water, leaving an impression of the negative.

Lithotype and Phototype Processes.—Both of these are photo-mechanical methods, in which the gelatine relief is itself used to print from in some form of printing-press, instead of being covered with a carbon print. In the phototype the gelatine relief is obtained by an autotype print instead of a leaf on a flat piece of iron, covering it at the same time with a smooth piece of sheet-lead, and then put them under sufficient pressure, the result would be an imperfect Woodburytype mould in the soft lead. The metal reverse would be faulty, because in this case the gelatine film is too thin to give enough of relief. In order to obtain a proper mould a layer of sensitised gelatine, considerably thicker than that used for an autotype print, is exposed under a negative. It is developed as in the autotype process, and presented in the same way. When the mould is transferred to glass, the print is covered with the lead, and they are pressed together in a hydraulic press, which produces a reverse or mould of the picture in the soft metal without injuring the gelatine relief. The production of ordinary Woodburytype prints is a purely mechanical operation, the chemical action of light not being called into play; they exhibit true gradation of tint, and in that respect Woodburytype is the only perfect photo-mechanical printing known. The mould is placed in a printing-press of a peculiar but simple construction, and a varnish containing the proper printing ink is applied to the mould, which is then allowed to dry. The mould is then placed in the printing-press, and the printing ink is printed on the piece of paper. The ink then adheres to the paper, and the mould presses the ink on to the paper, forming the picture. In this way the mould is transferred to the paper, and the picture is formed.

The production of ordinary Woodburytype prints is a purely mechanical operation, the chemical action of light not being called into play; they exhibit true gradation of tint, and in that respect Woodburytype is the only perfect photo-mechanical printing known. The mould is placed in a printing-press of a peculiar but simple construction, and a varnish containing the proper printing ink is applied to the mould, which is then allowed to dry. The mould is then placed in the printing-press, and the printing ink is printed on the piece of paper. The ink then adheres to the paper, and the mould presses the ink on to the paper, forming the picture. In this way the mould is transferred to the paper, and the picture is formed.

Mr. Green, in conjunction with his partners Messrs Cross and Bevan, published the process at a meeting of the British Association at Leeds in 1890.
PHOTOGRAPHY

Photo-lithography and Zineography.—The only difference between these is that a lithographic stone is used in the one case and a plate of zinc in the other for the mechanical printing. It is necessary that the original drawings should be done in lines and not in half-tint. At least, it is doubtful whether much success has as yet attended the production of half-tint photo-lithographs. A negative is taken from the drawing by the camera, and from it for the mechanical printing. It is necessary that the original drawings may be made of any convenient material, and reduced on the wood—a great consideration when minute objects are to be represented. In the first case, one process is first to render the surface of the block waterproof, and then it is whitened with Chinese white. The block is then sensitised with chloride of silver, and printed under a reversed negative. It is then toned with gold and fixed with hyposulphite of soda, washed and dried, and is then ready for the engraver.

In the carbon process, a carbon tissue is made with very little gelatine and a large amount of carbon. It is then sensitised with chloride of silver, and printed on a block printed waterproof and whitened with baryta; the carbon print is developed on the wood with warm water, and, when dry, is ready for the engraver.

Photo-micrography consists in photographing microscopic objects by causing a microscope to take the place of the ordinary photographic lens in the camera, so that the enlarged image is cast upon the sensitive surface of the collodionised or gelatine plate. Such photographs, again enlarged by the optical lantern, are much used for class instruction.

By reversing the arrangement necessary for the enlargement of microscopic objects it will be seen that minute photographs of engravings, or other objects, may be produced which would require a microscope for their inspection. In this way considerable detail may be obtained in the interesting study of Paris, when copies of letters and newspapers were inserted in quills, and fastened to carrier pigeons.

Astronomical Photography.—The application of photography to astronomy has within the past few years opened up a new and a fertile field. Great results have been achieved through the wedging of the camera with the telescope. Until recent times the only remarkable photographs of the celestial bodies were those of the moon, which were executed by Warren de la Rue, Rutherford, and others. The moon being from its size and brightness a comparatively easy body to photograph, the early processes were sufficient for the purpose, and most perfect results were obtained. Janssen and others have secured photographs of the sun which exhibit markings upon its surface with great distinctness, and many photographs of the corona when the orb has been under eclipse have also been taken when the sun's sunspot is present. But it is in picturing the distant stars and nebulae that the greatest work has been achieved by photography, and results obtained which would have been impossible without the aid of the highly sensitive dry plates now at the disposal of the astronomer. Among the triumphs already obtained in this direction may be mentioned Roberts' photograph of the 'Andromeda Nebula,' Common's photograph of the Nebula in Orion, and several similar negatives obtained by the brothers Henry of Paris. One of these last workers, a photographer of the Pleiades, should receive special mention. A certain star in this well-known group appeared in the photograph in question with a nebulous haze attached to it.

This star was not known to be associated with a nebula, and the astronomical community was deavoured to detect it by aid of the smallest powerful telescope at their disposal. The nebulous mass was therefore discredited, until another photograph of the Pleiades arrived shortly afterwards from America, which exhibited exactly the same peculiarity. One of these last, as the astronomer was in the act of discrediting another, and at length was declared to be faintly discernible. From this it would seem that the photographic film is more sensitive to faint impressions than is the retina of the eye, and in a certain sense this is true. These star photographs are often even more striking than the negatives of the distant objects for three or four hours, during which time the clock-work train attached to the telescope keeps the images of the tiny points of light stationary on the plate, in opposition to the rotation of the earth. Each image, however faint, has therefore a comparatively long time to make an impression on the sensitive chemical surface, and exerts a cumulative action, with the result that the images of stars are registered which no human eye has ever beheld. To put the matter more plainly, it may be said that certain sections of the sky covered by these photographic telescopes contain a definite number of stars. When this same space is photographed their number is often doubled. At a convention of astronomers held in Paris in 1887 it was decided to take steps for photographing the whole of the heavens. For this purpose the sky has been charted out into squares, and each observatory helping in the work will photograph a certain number of these spaces. The work is estimated to entail ten years' labour, this long time being partly accounted for by the circumstance that, even during the few hours of clear weather and the interruptions caused by moonlight, there are only about fifty nights in the year when sidereal photography is possible. There are many difficulties in photographing the stars, some of which have led to discussion, and have caused the extreme distance of the bodies to be ascribed to the nature of the atmosphere. It is believed to be due to irradiation, want of complete achromatism in the lenses, and reflection from the back of the photographic plate. These difficulties will no doubt be surmounted in the future, and it may be mentioned...
that they are only observable when a refracting telescope is employed. Hence the use of reflecting telescopes for photography has been suggested; but, although by this means some of the faults mentioned are banished, other inconveniences arise which form obstacles to good work. Dr. Duggins has done much valuable work in photography of the heavenly bodies.

Durability of Photographs has been suggested by the introduction of specially prepared gelatine dry plates—known as orthochromatic ('right colour') or iso-chromatic ('equal colour'), both very vague terms—it is possible to reproduce colours in their true shade relation to one another. For instance, suppose that we seek to photograph the ordinary plate in a vase containing yellow flowers. In the resulting picture the vase will be white and the flowers will be black. But if we use iso-chromatic plates the vase will be rendered as a grey and the flowers will appear almost white, which is obviously the way in which the eye observes the original. This change in the behaviour of the sensitive surface is brought about by adding to the gelatine emulsion of which it is composed a minute quantity of certain dyes. Vogel in 1873 discovered that certain coal tar derivatives produce a change of sensitiveness in silver compounds; and in the same year Talifer and Clayton secured a patent for the preparation of colour-sensitive plates prepared by the same agency. They use an ammonium solution of eosine; and plates made under the patent are now supplied commercially. They are much used in copying all coloured objects, such as oil paintings; and there is little doubt that they will play an important part in sidereal photography, in the registration of coloured stars. Meteorologists are now depending upon photographs obtained from without with pictures of lightning (p. 207). A study of the latter is likely to extend our knowledge concerning the phenomena connected with thunderstorms, and has already elucidated a few problems. Maybridge, in the United States, introduced the system of analysing the form of pitting on a telegraph wire by a trotting horse, running dog, &c. By means of special apparatus he found it possible to take a dozen consecutive pictures of a single movement. Marey of Paris further developed this phase. In the cinematographic a series of photographs taken in rapid successionynuth a moving screen by the aid of a magic-lantern in the same rapid manner in which they were taken, the result being a life-like reproduction of the original scene. Photography through an opaque object by means of the Röntgen rays (see RÖNTGEN) has already been of immense use in surgery in fixing the exact position of a foreign body such as a bullet in the human body as a preliminary to their extraction.

Although photographing in colours has long occupied the attention of scientific photographers, no direct method of doing so has yet been described. One, and perhaps the most important of the indirect methods, is in taking separate (colourless) negatives of a coloured object are taken through coloured screens. From these positives are taken, and colour is supplied by means of inks or dyes. When these three-coloured monochromatic positives are superimposed, and seen by projection on a screen or through a photo-chronoscope, a coloured image of the original is the result.

BIBLIOGRAPHY.

Chapman, Jones, Science and Practice of Photography; Abney, Instruction in Photography, and Photography with Emulsions; War, Modern Dry Plates; Robinson and Abney, Art and Practice of Silver Printing; Robinson, Picture-making by Photography; J. R. Sawyer, The A.B.C. Guide to Autotype; Lescagang, Manual of Carbon Process; Meddows, Photographic Chemistry, Chapwick, The Dry Lifetime Albumen, Hepworth, Photography for Amateurs and Book of the Lantern; Wilkinson, Photo-engraving and Lithography; Munckheven, Photographic Optics; Burton, Optics for Photographers; Stenersen, Lithographic and Photographic Lenses; Harrison, History of Photography; Schnauss, Collotype and Photo-lithography. See also periodical literature, and especially the annual publications, Year-book of Photography, Almanac, &c.

Photogravure. By this process the finest possible results are obtained, but the expense of producing pictures by its aid, which is akin to the operation of copperplate printing, limits its use to high-class book-work. It is also used by Boussod, Valadon & Co., by Durand of Paris, by the Autotype company, by the commercial printers of Glasgow, and others for the production of large pictures which rival the finest steel engravings in their delicacy and finish. Photographs can be reproduced in this form, but the process seems to be more largely employed for obtaining engraving-like copies of celebrated pictures. The process is so perfect that every touch of the painter's brush is clearly seen in the copy, and even the upstanding ridges of paint in the bolder touches are rigidly reproduced. There are naturally different ways by which printing plates for use in this process are prepared. Of these methods only must here suffice to give an indication of the line of operations. (1) A gelatine relief is obtained by exposing bichromated gelatine to the action of light beneath a negative. But the gelatine employed is mingled with a certain quantity of graphite (black lead) in a more or less granular form. This addition causes the resulting relief to have a surface which is granular in character, and which is also a conducting me to electricity. If therefore the relief be placed in an electrolyte bath it will speedily become covered with a deposit of copper. From this study, and the method so far described, copies on paper can be obtained by the usual copperplate printing process. (2) A bichromated gelatine print—negative in character—is developed upon the specially prepared surface of a copper plate, which is then subjected to the action of a solution of petroleum spirit. The rate at which the negative is dissolved is speeded up or more or less quickly according to its varying thickness, and then attacks the copper, which is eaten away by the chemical action that ensues. Thus in the end the copper plate bears on its surface an etched image, penetrating more or less in depth according to the difference in density of the negative image previously affixed to it. The plate is next 'steelfaced' and printed in the copperplate press. (It is often necessary to resort to hand-finishing in order to get the finest results.)
Photometry (Gr. phōs, 'light,' and metron, 'measure'), the art of measuring the intensity of a source of light, by comparison with a standard of known intensity. In the first experiment the two sources of light are compared by putting them side by side in a scale in which the distances are equal and the apparent diameters proportionate to the intensities of the lights as before and the corresponding vibrations are also compared. It was also found that a very audible sound could be procured from the selenium without the aid of telephone and battery. A beam of intermittent light will produce a strong musical note from the selenium.

Further experiments showed that selenium is not the only substance thus sensitive to light. Still louder sounds than those obtained from the selenium directly, though not articulate, were got from diaphragms of hard india-rubber and of antimony; and sounds of varying intensity were given out by many other substances, including gold, silver, platinum, copper, zinc, lead, paper, parchment, and wood.

**Physphere.** See SUN.

**Phrenology.** (Gr., 'a discourse on the mind') was the name given about 1815 to the theory of mental philosophy founded on the observation and discovery of the functions of the brain concerned in intellectual and emotional phenomena, as formulated by Gall (q.v.) in Britain the system was simply expounded by Gall's pupil Spurzheim (q.v.), by George and Andrew Combe (q.v.), and by Dr. Elliottson, founder and first president of the Phrenological Society; and in America by Dr. Charles Caldwell of Kentucky, the brothers Fowler, and S. R. Wells. The connection of mind and brain was an old theory, and a kind of localisation of mental function in the brain had at various times been attempted from the days of Albertus Magnus downwards; but the first full-fledged system of empirical craniology or phrenology must be attributed to Gall, who established his scheme by his examination of the skulls of persons belonging to different nations, and of persons of different character; and believing himself to find portions of the skull corresponding to their mental and moral faculties, marked out on a model of the head the areas which were in his opinion the seat of the various faculties. These faculties were divided into two orders—Feelings and Intellect, or Affective and Intellectual Faculties. The Feelings were divided into two genera—the Propensities and the Sentiments; while the Intellectual embraced the Perceptive or Knowing and the Reflective Faculties. Various modifications of Gall's scheme of localising the faculties were made by his pupils. American phrenologists (the Fowlers and S. R. Wells) increased the number of the faculties to

Bell, his friends, and assistants devised some fifty forms of apparatus, for so varying the transmission of light to prepared selenium as to produce audible sounds. In this way photophone found most serviceable the transmitter is a plane mirror of silvered micro.

"..."
PHRENOLOGY

forthree; dividing the affective series into the
domestic, selfish, moral, and self-perfecting groups,
and the intellectual into the perceptive and reflec-
tive groups. The following is a representation of
the human head from four points of view, showing
the positions of the cerebral organs, according to
Spurzheim and Combe:

AFFECTIVE.

I.—PROPRIETIES.
1. Amativeness.
2. Phil Prophetiveness.
3. Inaptiveness or Concentriveness.
4. Adhesiveness.
5. Combativeness.
6. Destructiveness and Alimentiveness.
7. Secretiveness.
8. Acquisitiveness.

II.—SENTIMENTS.
10. Self-esteem.
11. Love of Approval.
12. Cautionness.
15. Firmness.
17. Hope.
18. Wonder.
19. Idiocy.
20. Wit.

INTELLIGUAL.

I.—PERCEPTIVE.
21. Individuality.
22. Form.
23. Size.
24. Weight.
25. Colouring.
26. Locality.
27. Number.

II.—REFLECTIVE.
28. Comparison.
29. Order.
30. Eventuality.
31. Time. 32. Taste.
33. Language.

PHRYNE

tion the most important feature of the brain. Parts
of the external surface are known to have functions
other than those attributed by phrenologists; the
frontal slims of the skull is sometimes large enough
occupied by the region allotted to four or five phrenol-
logical organs; and there are many osteological
variations in the several bones of the skull which
obviously have nothing to do with brain-functions
or mental processes. An outline of what is known
as to the localisation of brain-functions will be
found in Brain, Vol. II. p. 790. For cranological
characters, see SKULL, ETHNOLOGY; and see also
PHYSIOGNOMY, PSYCHOLOGY.

See the phrenological works cited at GAUL, SPURZ-
HEIM, COMBE; Bousneiss, Course de Phrenologie (1836);
Flourens, Examen de la Phrenologie (1842); O. S. Fowler,
Practical Phrenology (1846); Laycock, Mind and Brain
(1860); Professor Bain, On the Study of Character, in-
cluding an Estimate of Phrenology (1861); the Phreno-
logical Journal (1852-47); Carus, Grundriss einer neuen
Krankenkunde (1841), and Anna der Krankenkunde (2d ed.
1864); Willich, Physiognomie und Phrenologie (1870);
Scheve, Katechismus der Phrenologie (7th ed. 1884).

Phrygia, a country in Asia Minor, the extent
and boundaries of which varied very much at
different periods of ancient history. In probihis-
toric ages it is believed to have comprised the
greater part of the peninsula, but at the time of
the Persian invasion it was limited to the districts
known as Lesser Phrygia and Greater Phrygia—the
former stretching along the shores of the Propontis
and the Hellespont to Tras (afterwards part of
Mysia), the latter occupying the centre of Asia
Minor. Phrygia was in general a high and some-
what barren plateau, though its pastures supported
immense flocks of sheep, noted for the fineness
of their wool. The most fertile part was the valley
of the Sangarius, but the most beautiful and pop-
ulous district was the south-west, at the base of
the Taurus, where the Mysian and other streams
had their rise. The mountains and streams yielded
Phrygian barley was anciently celebrated,
and the cultivation of the vine appears to have
been extensively carried on. The Phrygians were
apparently closely related to the Armenians,
and have left their traces in almost all parts of Asia
Minor. Later they were forced within narrower
limits by the intrusion of Scythian and other aliens
—Lydians, Carians, Thracians. In the 6th century
Cresus conquered all that was left of Phrygia, and
in 549 B.C. it was ceded to the Persians. The influ-
ence of Phrygian religion on Greek mythology
seems to have been great. Among their deities
were Men or Muses, Cybele, and Athys; and
Phrygia was a great centre of orgiastic worship
and celebrations.

See W. M. Ramsey, The Cities and Bishoprics of
Phrygia (1895-97). For the Phrygian Mode, see HAM-
MONY; for the Phrygian cap, see BONNET.

Phryne, a celebrated courtesan, was the daugh-
ter of Iepites, born at Thespiae in Boeotia, and
originally earned a livelihood by gathering vipers
but as the fame of her marvellous beauty spread
she obtained numerous lovers, who lavished gifts
her so profusely that she became enormously
rich. In proof of this the story goes that she
offered to rebuild the walls of Thebes if the citi-
zens would allow her to place this inscription on
them: 'A virtue destroyed, a courtesan, rebuilt.' The Thebans declined
the proposal. Her enemies accused her of prin-
ating the Elusinian mysteries. Summoned before
the tribunal of the Helioots, she was defended by
the rhetorician Hyperides, one of her lovers, who,
perceiving that his eloquence would not avail
the judges, threw off her robe and showed
her naked loveliness. She was immediately
acquitted, and carried in triumph to the Temple of
Phyllophora, the vine, and has cost France alone a pecuniary loss far exceeding that of the Franco-German war. It seems to have been discovered in North America in 1854, and in all likelihood was carried thence to Europe, where it appeared about 1863. It now occurs in all vine-growing countries. In some of its features it is like a little aphids, measuring about 1/4th of an inch in one of its stages, or only a fourth of that in others, varying from yellow to reddish brown in colour. The antennae are thick,

Phrynichus, (1) an Athenian tragic poet, who gained his first dramatic prize in 511 B.C., twelve years before Eschylus, and his last in 476, when Themistocles was his chorasgo. He seems to have gone to the court of Hiero in Sicily, and to have died there. He introduced music representing women, and to the light minuet choras of Theseus added the sublime music of the dithyrambic choruses. His most famous tragedies were the Phoenicis, which is supposed to have inspired the Persae of Eschylus, and another which had for its subject the capture of Miletus by the Persians. So overpowering was its effect that the audience burst into a passion of tears, fined the poet a thousand drachmas for so harrowing a description of the sufferings of a kindred people, and forbade the piece ever again to be represented. His scanty fragments will be found in Nanek's Tragicorum Fragmenta (1586).

(2) A poet of the old Attic comedy, who was honoured by the abuse of his great contemporary Aristophanes (Rut. 14) for his low buffoonery. His fragments are collected in Meinike's Fragmenta Comicaorum Graecorum (1859-57) and Koch's Comicorum Atticorum Fragmenta (1880 et seq.).

(3) A Greek grammarian and sophist who flourished under Marcus Aurelius, and wrote a collection of select specimens of Attic usage intended for the benefit of his friend Cornelius, secretary to the emperor. It consists of almost four hundred short unconnected dicta on the orthography, signification, and use of particular words, and upon the rules of accidence, especially in verbs. The edition by Lobeck (1820) was followed by The New Phrynichus, by W. Gunton Rutherford (1831).


Phthiotic, the south-east corner of Thessaly (q.v.), the home of Achilles.

Phthisis. See CONSUMPTION.

Phylactery (Gr. phosphateira, 'an amulet'), the name given in the New Testament to small square boxes of parchment or black calf-skin, containing strips of parchment or vellum with certain texts of Scripture (Exod. xiii. 2-10, 11-17; Dent. vi. 4-9, 13-22) written on them. The phylacteries are worn on the left arm and on the head by all Jews (except Karaites) above thirteen years of age on week-day mornings during the time of prayer. This is done in accordance with their interpretation of Exod. xiii. 9-16. Some Russian and Polish Jews wear phylacteries all day; and they have at times been worn as amulets against demons. The writing of phylacteries is in the hands of privileged scribes (Soferim) only, and many and scrupulous are the ordinances which they have to follow in the execution of this task.

Phyllicite, a schistose clay-rock, containing a variable proportion of quartz in grains, together with mica, usually chlorite, and sometimes many accessory minerals. The rock is more crystalline than clay-slate, and passes into mica-schist. The surfaces of the folia in phyllice are frequently finely wrinkled.


Phylloxera (Gr. phyllon, 'a leaf,' and xeros, 'dry'), a group of insects belonging to the family (Phylloxeridae) nearly related to aphides and certain insects, and included within the sub-order Hemiptera in the order Hemiptera or Rhynchota. Two or three species occur in Europe, living like many related forms as parasites on plants. Most important is P. vastatrix, which ravages
Phylogeny

Phylo- or phylo-, "race," and -genus, a biological term applied to the evolution or genealogy of a race or tribe. It is used in contrast to "ontogeny"—the development or life-history of an individual; witness Haeckel's "biogenetic law": "Ontogeny is a recapitulation of Phylogeny." See Darwinian Theory, Embryology, Evolution, Heredity.

Physalia. See Portuguese Man-of-War.

Physalis. See Winter-Cherry.

Physeter. See Whale.

Physicians, The Royal College of, was founded by the munificence of Thomas Linnaeus (q.v.), a physician and scholar. In 1718, through the influence of Cardinal Wolsey, he obtained from Henry VIII, letters-patent granting to John Chamier, himself, and Ferdinando de Victoria, the acknowledged physicians to the king, together with Sir Henry, Sir John, Sir Francis, Robert, John, and all other men of the same body in London, to be incorporated as one body and perpetual community or college. They were permitted to hold assemblies, and to make statutes and ordinances for the government and correction of the College, and of all the same faculty in London and within 7 miles thereof, with an interdiction from practice to any individual unless previously licensed by the president and College. Linnaeus was the first president, and held the office till his death in 1524. The meetings of the College were held at his house in Knightbridge or St. James's Street, near Lincoln's Inn Fields, and which until the year 1600 continued in the possession of that body. About the time of the accession of Charles I. the College, requiring more accommodation, took a house at the bottom of Amen Corner, which was subsequently purchased by Dr. Bacon, Hamping being given by his colleagues. This was the seat of the College till 1666, when it was destroyed by the great fire of London. A new College was then built in Warwick Lane, and opened in 1674 under the presidency of Harvey's friend, Sir George Ent; and there remained until 1722, when the present edifice in Pall Mall East was opened under the presidency of Sir Henry Halford.

The reason for forming the incorporation, as set forth in the original charter, is "to check men who profess physic rather from avarice than in good faith, to the damage of credulous people," and the king (following the example of other nations) founded a college of the learned men who practise physic in London and within 7 miles, in the hope that the ignorant and rash practisers be restrained or punished. The charter further declares that no one can be admitted to the said city, or within 7 miles, without the College license, under a penalty of £5; that, in addition to the president, four censors be elected annually to have correction of physicians in London and 7 miles' circuit, and of their medicines, and to punish by fine and imprisonment; and that, the president and College be exempt from serving on juries. Four years later, in 1522-23, an act was passed confirming the charter, and enacting that "six persons before-said named as principals and firstnamed of the said commonality and fellowship shall choose to them two men of the said commonalty from henceforward to be called and cleped Elects, and that the same elects yearly choose one of them to be president of the said commonalty;" and further directing that, in case of a vacancy by death or otherwise, the surviving elects shall choose successors.

In 1540 an act was passed in which it was declared explicitly that "surgery is a part of physic, and may be practised by any of the company or fellowship of physicians—a doctrine which in later times has been totally repudiated by the 'collegians' of England, who now not admittance to their privileges a member of the Royal College of Surgeons, unless he formally resigned his surgical diploma. Other acts were passed in 1553, 1584, and 1588; the last known as the "Medical Act," providing for the granting of a new charter to the College, which was obtained in 1662. Finally, in 1669, "an Act to Amend the Medical Act" was passed, which repeals the provisions of the Act of 1522-23 as to the elects, and declares that the presidency shall in future be an annual office, open to the Fellows at large, who shall also be the elects. At the present epoch the College consists of Fellows, Members, Licentiates, and Extra-Licentiates (in 1891, 288 Fellows, 466 Members, 4037 Licentiates, and 30 Extra-Licentiates). The Fellows are elected from members of at least four years' standing, who have displayed some degree of proficiency in medicine, or in the pursuit of medical or general science or literature. The government of the College is vested in the president and Fellows only. The present Members consist of persons who have attended the College, and have been received into the Society of Fellows or Licentiates of the College; extra-licentiates who have complied with certain conditions; and of persons who have attained the age of twenty-five years, and who, with rare exceptions, must be
graduates in medicine of a recognised university or licentiates of the College, who do not dispense or supply medicine, and who, after being duly proposed, have satisfactorily satisfied the College 'touching their knowledge of medical and general science and literature.' No candidate is admissible if engaged in trade or connected with a druggist's business, or who even practises medicine in partnership with another practitioner, so long as the partnership lasts, or admits of being disused, or otherwise used, the nature and composition of any remedy they make, the use of. The members are alone eligible for the Fellowship. They have the use of the library and museum and the privilege of admission to all lectures; but they do not take any share in the government or warrant or vote at meetings. The examiners for the membership are the president and censors. The Licentiates are not members of the corporation; they have access to the museum, lectures, and reading-room, but are not allowed to take books away from the library; they may compound and dispense medicines for patients under their own care, and in their qualifications very much resemble those who have diplomas both from the College of Surgeons and the Apothecaries' Hall. They must be twenty-one years of age, and have been engaged in professional studies for four years before being admitted. The fee for admission as a Fellow is thirty guineas, exclusive of stamp-duty; the Member's fee is also thirty guineas, and the Licentiates fifteen guineas.

The following by-laws of the College should be generally known: (1) No Fellow of the College is entitled to use for professional aid all that is contained by him. This by-law does not extend to Members. (2) No Fellow, Member, or Licentiates of the College is entitled to assume the title of Doctor of Medicine unless he be a graduate in medicine of a university. (3) No Fellow or member of the College shall officiously, or under colour of a benevolent purpose, offer medical aid to, or prescribe for, any patient whom he knows to be under the care of another legally qualified medical practitioner.

The Royal College of Physicians of Edinburgh was in 1617, in an attempt to incorporate the practitioners of medicine, and raise the standard of the profession. King James I. of England looked favourably on the proposal, and granted an order for its establishment. King Charles I. also gave the matter his attention and referred it to the Privy Council, which in 1629, in a manner issued a patent in its favour: all these attempts, however, were frustrated by the religious and political dissensions of the times, and it was not until 1681 that the body became incorporated under a charter from Charles II. A new charter with many important provisions was issued in 1831.

To the Physicians belongs the honour of having suggested in 1725 the plan of an infirmary in Edinburgh for the sick poor, which has developed into the present magnificent institution. From the first the College of Physicians has gratified, to the Royal Edinburgh Asylum for the insane and the Morningside was also first suggested by them in 1791. The College, which in 1890 had over 190 Fellows, possesses a library of upwards of 30,000 volumes, a valuable and interesting museum of medical and surgical objects, and a library of objects, for the purpose of aiding the prosecution of scientific research. An important arrangement was made in 1869 between this college and the Royal College of Surgeons (q.v.) of Edinburgh, making it competent to the College to examine, in order, by a joint examination, to give the degree of Fellow, embracing medicine and surgery. In 1884 a further consolidation of the Scottish medical corporations took place, by the institution of a triple qualification, granted by the Edinburgh colleges and the Faculty of Physicians and Surgeons of Glasgow conjointly.

Physic Nut (Curcas), a genus of plants of the natural order Euphorbiaceae, whose seeds are tropical shrubs or trees, having alternate, stalked, ovoid or oblong leaves, and coryns of flowers on long stalks. The Common Physic Nut of the East Indies (C. purpurea), now also common in the West Indies and other warm parts of the world, is a small warm bush, with a milky juice. It is used for fences in many tropical countries, and serves for a purpose with being much branched and of rapid growth. The seeds are cast for use to the taste, but abound in a very acid fixed oil, which makes them powerfully emetic and purgative, or in large doses poisonous. The expressed oil, commonly called Jalopyra-oil, is used in medicine like croton-oil, although less powerful; it is also used in lamps. Other species are C. multifidus and C. lobatus.

Physic, or Physical Science (Gr. phusikos, 'natural'), comprehends in its widest sense all that is classed under the various branches of mixed or applied mathematics, natural philosophy, chemistry, and natural history, which have contributed to the whole of our knowledge regarding the material universe. In its narrower sense it is equivalent to Natural Philosophy (q.v.), which until of late years was the term more commonly used in Great Britain, and denotes all knowledge of the properties of bodies as bodies, or the science of phenomena unaccompanied by essential change in the objects; while chemistry is concerned with the composition of bodies, and the phenomena accompanied by essential change in the objects, and natural history, in its widest sense, includes all the phenomena to the animal, vegetable, and mineral world. The use (now obsolete) of the term Physic for a branch of this last—viz. the science of medicine—is not peculiar to the 'English language. The Old French usage recognised phisique in the sense of medicine; while almost all languages have used some form of the word physicus for a practitioner of the art. See SCIENCE.

Physiocratic School, a school of political economists in France headed by Quesnay and Gournay, who, in opposition to the Mercantile System (q.v.), regarded agriculture as the great source of wealth, and recommended that the state should regulate legislation accordingly. Turgot (q.v.) was the most conspicuous member. See POLITICAL ECONOMY.

Physiognomy (from a Latin shortened form of the Gr. physiognomonia), the art of judging of the character from the external appearance, especially from the countenance. The art is founded upon the belief, which has long and generally prevailed, that there is an intimate connection between the features and expression of the face and the qualities and habits of the mind; and every man is conscious of instinctively forming impressions in this way for himself with more or less confidence, and of acting upon them to a certain extent in the affairs of life. Yet the attempt to reach this conclusion by the application of certain rules, and thus to raise the art of reading the human countenance to the dignity of a science, although often made, has by many been very successful. Comparisons were instituted for this purpose between the physiognomies of human beings and of species of animals noted for the possession of peculiar qualities, as the wolf, the fox, etc. The various views were propounded by Porta (died 1615), Campanella, Cardan, Ingegnzer, and especially by Lavater (q.v.). Darwin's Expression of the Emotions in Man and Animals (1872) is regarded as the first attempt to lays a rational physiognomic system on a basis of modern scientific
Physiography, a term formerly used of a branch of minology, was adopted by Professor Huxley as a convenient name for an exposition of the principles that underlie physical geography, and including the elements of physical science. Physiography is thus understood to involve a comprehensive discussion of gravitation, heat, the composition of the crust of the earth, the movements of the sea, the phenomena of the atmosphere, and many cognate subjects, treated in this work under separate heads. See Geography.

Physiologus. See Bestiary.

Physiology (Gr. physi and logos, 'discourse upon nature') is the science which treats of the mechanism of living beings, and of the functions of their parts. It is thus the sister-science to Morphology (q.v.), in which the outer form of living creatures and the structure and arrangement of their parts are considered. Both are included under the more general term Biology (q.v.). A physiological term is Hippocrates, who applied it to a spiritual entity which he supposed to be everywhere present, and to keep the processes of the body in order. This use of the word is still kept alive in oft-repeated phrases, as when in speaking of a sick person it is recommended that the cure be left to nature. There is an Animal Physiology, of which this article will mainly treat, and a Vegetable Physiology (q.v.); also a Comparative Physiology, which, however, is still very imperfect, for the details of the life-processes have been investigated in not more than a dozen animals. Comparative physiology consists chiefly of a series of inferences as to function from comparative morphology, and these must be often erroneous. There is a still wider science, which might be called Universal Physiology. For as all the organs of the body are mutually related, so that if one be deranged all the others will be more or less affected, are there close relationships between the various creatures of the globe. Thus, to quote Semper, Animal Life (1881): 'If the American prairies were to cease to produce grass, the first result would be the extinction of the buffalo herds of buffaloes, and on their existence depends that of the surviving remnant of the ancient Indian population of America. If the various insectivorous birds of North America were exterminated, within a very few years beyond a doubt all the produce of the food districts that contain them would be destroyed. If we change the mode of life of any single animal, the change will instantly have an influence on all the other animals whose healthy existence was in any way dependent on its normal function before it was altered. The most obvious relation of this sort is that which exists between plants and animals; similar ones hold good for human beings in their relationship to other living things, and to each other. Thus we see in Political Economy, the science which treats of the laws of human activities, a department of the science of physiology. A still wider application of this science would be to the study of plants, a subject called Phycology (q.v.).

In view of the fact that the intimate relations between chemical, physical, and living processes are becoming daily more evident, it would be quite consistent that morphology should deal not only with the forms of plants and animals but also with those which the dust of the earth, the pyramid, and star, while physiology would treat of the forces and chemical processes concerned.

Knowledge of the bodily functions has been gained in three ways: (1) by observing the normal processes of life; (2) by experiments upon them; (3) by studying the effects of disease, that is, pathomorphology.

No science can advance rapidly or with certainty without experiment, and most of our precise knowledge of physiology has been gained in this way, from the time when Galen proved that the arteries during life contain blood, or when Harvey demonstrated the circulation of that blood. As an example of how we may learn from disease, we may note the discovery that the spleen produces white blood-corpuscles, following from the observation that in morbid enlargement of that organ the blood contains an increased number of these cells.

The functions of the body consist of (1) Movement, (2) Nutrition, (3) the activities associated with the Nervous System, (4) Growth and Reproduction—the latter being considered as continued growth. Movement is performed by the contraction of muscles, definitely arranged, especially with relation to the skeleton or supporting structure. Nutrition is a general term including all those processes concerned in the supply of matter and energy to the body, and the removal of waste products. It may be considered under three headings: (1) the introduction of food into the body and its carriage to the tissues; (2) the changes of this matter within the tissues; (3) the removal of waste matters from the tissues and from the body—Excretion (q.v.). The first includes (a) the eating and drinking of solid and liquid food, and the intaking of oxygen, a part of Respiration (q.v.); (b) the Digestion (q.v.) of the food; (c) its absorption into the Blood (q.v.); (d) the circulation of the blood and its associate the Lymph (q.v.), by means of which the tissues are bathed in a stream of food derived from the waste matters from them. The nervous system is the co-ordinator of all the processes of the body; it consists of the Brain, Spinal cord, Sympathetic system, and the associated Nerves and smaller Ganglia; in close connection with it are the sense-organs, the eyes, ears, nose, tongue, and general nerves of touch and temperature; the brain is the seat, or at all events the chief seat, of consciousness, and the 'organ of thought and other mental processes. The functions of the body are dealt with in separate articles; here we shall give a short account of their development in the lower animals.

Let us first consider the life of the simplest animals. Almost invisible to unaided sight, flourishing in the stagnant water of ponds, without separate organs, they are little more than tiny masses of jelly-like Protophora (q.v.). Their life seems to consist merely in the absorption of food and reproduction; possibly they possess the elements of consciousness. For movement a source of energy is required; this is found in their food—minute organisms, and organic particles dissolved in the water in which they live. These consist of substances which may be utilized by the plants which are able to utilise the energy of the sun for their growth, or remains of plants or animals which have fed upon plants (see Vegetable Physiology). Thus we see in animal
protoplasm a machinery for the transformation of potential energy into energy of motion. This machinery is constantly breaking down and being repaired, the protoplasmic matter is continually being replaced by new matter similarly combined.

But, as the protoplasm is extremely complex, the simpler substances of the food have to be combined in the correct manner and in the correct amount to produce increasing complexity until the complex living matter is formed. These combinations are supposed to be due to a ferment-like power of the protoplasm. This power it is which makes growth possible—i.e., the actual increase in animal tissue (q.v.) or plant growth (q.v.). The energy that can be extracted out of its solution is probably a process not utterly unlike, though much simpler, Growth of a crystal may seemingly be endless, but growth of a cell never proceeds beyond a certain point, when the process known as Cell-division occurs. The mass of protoplasm divides into two halves, and each half goes on to live as before. The necessity for cell-division arises partly from the conditions of the food-supply. Food is absorbed through the surface of the cell, but with growth the mass to be fed increases in a faster rate, and sooner or later division must occur at a certain stage of growth unless the cell divides. The higher animals are built up of numberless cells which have all arisen, by division, from a single cell, the ovum; but instead of becoming separated they have all kept together, jointed together, to form the animal body. As long as the cells are massed into tissues and the tissues into organs, the organs having special functions. This difference in the behaviour of the cells of different parts of the body is known as Division of Labour (q.v.). We can form some idea of its origin. Imagine a large number of cells feeding on the same food, and let the food not be able to remain loosely joined together; the outer and inner cells would live under different conditions and would assume different functions. The whole story of the evolution of life, both in the origin of individual forms and in the growth of nations, is simply the process of the division and amalgamation of labour. For just as an organism is a collection of cells, each having its own life, yet all bound together for mutual service, so is a nation a collection of individual men and women. And as the perfection of an animal is measured by the completeness of the division of labour among its cells, so is the civilisation of a nation measured by the harmony of organisation of its labour. Further, just as there have been many species of animals which have appeared, lived for a time, and then given place to higher species of animals, civilisations which have flourished for a time and then died away. Any fairly complex civilisation will serve as a type of the division of labour in the body of one of the higher animals. First there are the persons concerned in the getting of food, like the limbs and mouth of an animal. Then the food is prepared for use by other labourers; such are the digestive organs of the animal. The food has to be distributed to all members of the community by merchants and carriers; the blood and the blood-vessels perform this function. The body of the animal is kept warm by the action of the digestive organs, directed and governed, and made to act harmoniously by the statesmen of a nation; the same things are done by the senses, the brain, and the nervous system of an animal.

We have already remarked the source of all the energy of an animal lies in its food. We know that this is either burnt as it were within the tissues, used as fuel for the protoplasmic machinery, or used to keep that machinery in repair; in either case the food-stuffs have to be prepared before they can be used. Such preparation is called digestion, which consists in making the solid food-stuffs divisible. The digested food is absorbed into the blood, and all of it, except the fat, is carried directly to the liver. This organ, amongst other functions, regulates the composition of the blood; thus, it stores the sugar in its cells, and gives it out as other the tissues require. Muscular tissue is the great consumer of sugar, which is to the cells what coal is to the steam-engine. Buoyancy, warmth and most important food-stuff that requires no digestion. This is oxygen, which is needed by the protoplasm for its life, and also for the burning of fuel within the living machinery to get heat and energy of motion. The oxygen is held in the blood (q.v.) and from this oxygen a cell greedily absorbs it from the air in the lungs, and yet gives it up readily to the protoplasm of the tissues. The blood as is well known circulates round and round the body, pumped by the heart. It is a stream of food material by which each cell of the tissues is fed. For each cell is close to a capillary, which is a very thin walled blood-vessel, through which the fluid food ounces, and thus bathes the tissues. The matter which has thus passed out of the blood-vessels is collected in other vessels, and is ultimately eventually emptied into one of the great veins. The lymph stream is also the drain into which is thrown by each cell the waste products of its activity. The carbonic acid that is formed in the tissues is carried away by the blood, and escapes out coast the stream-vessels. But there is another put water is also got rid of in the same way, and some more of it is sweated out by the glands in the skin; the rest is filtered out of the blood by the kidneys. There are many other waste matters besides carbonic acid and water. These are to a general the cell body; some are taken out of the blood of other organ, being poured into the intestine, mixed with other matter, dissolved in a fluid called bile (q.v.). They are all taken out of the blood by the kidneys, and cast out of the body as urine.

This finishes our sketch of the labours of the inferior members of the cell community. The more skilled workmen are the cells of the sense-organs and the nervous system; these are described in other articles. As has been noted, their function is to inform the community of what is going on in the outside world, and to keep in harmony all the diverse labours of the various organs.

The function of Reproduction is treated in that article. The organs are the machinery of life to consider and the fact of death. The general theory of the length of life is set forth in the article on longevity. The usual view of death is that it is inherent in living matter; that there is some cause which renders the cells of the body, after a certain period of life, and after a certain number of divisions, less and less able to nourish themselves, to continue dividing, and to keep the body in repair. Recently it has been suggested by Weismann that death has been evolved by natural selection as a protective against the continuance of individuals (for no one can escape slight injuries) that would be only a burden to the species.

For Comparative Physiology, see the articles on the various functions and groups of animals.

The History of Physiology. As we have already remarked the source of all the energy of an animal lies in its food. We know that this is either burnt as it were within the tissues, used as fuel for the protoplasmic machinery, or used to keep that machinery in repair; in either case the food-stuffs have to be prepared before they can be used. Such preparation is called digestion, which consists in making the solid food-stuffs 375
and lastly, the essential constituent of the body is water: 'Water is the flesh of living things.' The last three stages, beginning with the analysis of organs into tissues, have been developed within the last hundred years. The history looked at from this point of view is enlarged upon in the article Biology; here we shall give a history of a more detailed nature. The three periods—(1) the speculative period; (2) that associated with the name of Aristotle; (3) headed by Galen, (4) by Harvey and Haller, and (5) by Müller. The first period opens with the beginning of medical science in India, China, and Egypt. The Jews were the first to establish medical practice, hygiene and dietetics. Thus came the philosophers of Greece. Matter was supposed to consist of four elements, fire, air, earth, and water. The essence of life was referred first to one and then to another of these elements by various philosophers; by Thales to water, by Anaximenes to the air, by Xenophen to the earth, by Pythagoras to fire or heat. Hippocrates, the father of medicine, about 430 B.C., was the first to pass to a purely rational spirit. Observing carefully the facts of disease, he strove to found the art of medicine upon the results of experimental observation, discarding all supernatural causes, and not to special visitations of the gods; and as already noted, he postulated a spiritual essence universally diffused; this he called Nature. Physiogam, and to this he ascribed the maintenance of things in their normal state, and their restoration if disturbed. The second period is headed by Aristotel, the father of natural history, about 350 B.C. He dissected many animals, and attempted to discover the uses of the various parts. It is difficult to estimate correctly the exact value of Aristotle's work in physiology; it must be measured more by the method of research which he initiated than by the actual results achieved. Thus, to give an example of his ideas on the subject, the heart he imagined as the seat of the 'rational soul;' the nerves he supposed to arise in the heart; of their function he was ignorant. What is perhaps more surprising is that he described the brain as an inert viscous, cold and bloodless, whose only function was to cool the heart, and not comparable in importance to the other organs of the body. Erasistratus, the grandson of Aristotle, about 300 B.C., was perhaps the first to carefully dissect the human brain. He traced the sinuses and nerves with great accuracy, and found that the complexity of the convolutions of the gray matter was greatest in man, and that they were to some extent a measure of the intelligence. The next 400 years were barren of any useful advance; the practice of medicine reached perhaps its lowest point. The literature is occupied with discussions as to the 'animal and vital spirits,' terms used before Aristotle to express the powers of living things. The animal spirits were those that ruled over those actions of living things that were supposed to be quite different from anything that takes place in the body of a living, without the vital spirit. The vital spirits were those that were concerned in those processes going on in the body which were the result of purely chemical and physical laws. We no longer discuss whether the vital spirits live in the heart and the animal in the brain, but we have not yielded to the prejudice that the vital spirits are the essential of the living world and those of inorganic matter.

About 150 A.D. Galen, a Roman, revived the sounder method of experimental inquiry; he is the leader of the third period. He perceived that mere discourses were not sufficient to give an adequate explanation as to the functions of the living, and accordingly performed many experiments upon living animals. He proved that during life the arteries contain blood and not air, as was thought to be the case up to that time, by simply opening a vessel of a living animal. He also directed much of his study to the brain and nervous system. He was the first to state definitely that the brain, spinal cord, and nerves are the organs of sensation, intelligence, and the originators and guides of properly ordered voluntary movements; and he finally refuted the doctrine of Aristotle by proving that the brain was hot and not cold, and by arguing also that if it were a mere cooler of the blood it need not be elaborately organised. He pointed out that the brain was of the same substance as the nerves, but softer, 'as it should necessarily be, inasmuch as it receives perceptions from the organs of sensation, and turns them into thoughts and imaginations, and then has to comprehend all the objects of the understanding, for what is soft is more easily changed than what is hard.' He discovered also that the nerves of sensation and of motion are distinct, and thus explained the double supply of nerves to the tongue and eyes. For centuries Galen exercised an undisputed sway over the practitioners of medicine and the students of allied philosophy.

Some centuries afterwards the so-called Arabian physiology arose. Avicenna, about the year 1000, was its first exponent, and to natural causes and to special visitations of the gods; and as already noted, he postulated a spiritual essence universally diffused; this he called Nature. Physiology, and to this he ascribed the maintenance of things in their normal state, and their restoration if disturbed. The second period is headed by Aristotle, the father of natural history, about 350 B.C. He dissected many animals, and attempted to discover the use of the various parts. It is difficult to estimate correctly the exact value of Aristotle's work in physiology; it must be measured more by the method of research which he initiated than by the actual results achieved. Thus, to give an example of his ideas on the subject, the heart he imagined as the seat of the 'rational soul;' the nerves he supposed to arise in the heart; of their function he was ignorant. What is perhaps more surprising is that he described the brain as an inert viscous, cold and bloodless, whose only function was to cool the heart, and not comparable in importance to the other organs of the body. Erasistratus, the grandson of Aristotle, about 300 B.C., was perhaps the first to carefully dissect the human brain. He traced the sinuses and nerves with great accuracy, and found that the complexity of the convolutions of the gray matter was greatest in man, and that they were to some extent a measure of the intelligence. The next 400 years were barren of any useful advance; the practice of medicine reached perhaps its lowest point. The literature is occupied with discussions as to the 'animal and vital spirits,' terms used before Aristotle to express the powers of living things. The animal spirits were those that ruled over those actions of living things that were supposed to be quite different from anything that takes place in the body of a living, without the vital spirit. The vital spirits were those that were concerned in those processes going on in the body which were the result of purely chemical and physical laws. We no longer discuss whether the vital spirits live in the heart and the animal in the brain, but we have not yielded to the prejudice that the vital spirits are the essential of the living world and those of inorganic matter.

About 150 A.D. Galen, a Roman, revived the sounder method of experimental inquiry; he is the leader of the third period. He perceived that mere discourses were not sufficient to give an adequate explanation as to the functions of the living, and accordingly performed many experiments upon living animals. He proved that during life the arteries contain blood and not air, as was thought to be

PHYSIOLOGY

the case up to that time, by simply opening a vessel of a living animal. He also directed much of his study to the brain and nervous system. He was the first to state definitely that the brain, spinal cord, and nerves are the organs of sensation, intelligence, and the originators and guides of properly ordered voluntary movements; and he finally refuted the doctrine of Aristotle by proving that the brain was hot and not cold, and by arguing also that if it were a mere cooler of the blood it need not be elaborately organised. He pointed out that the brain was of the same substance as the nerves, but softer, 'as it should necessarily be, inasmuch as it receives perceptions from the organs of sensation, and turns them into thoughts and imaginations, and then has to comprehend all the objects of the understanding, for what is soft is more easily changed than what is hard.' He discovered also that the nerves of sensation and of motion are distinct, and thus explained the double supply of nerves to the tongue and eyes. For centuries Galen exercised an undisputed sway over the practitioners of medicine and the students of allied philosophy.

Some centuries afterwards the so-called Arabian physiology arose. Avicenna, about the year 1000, was its first exponent, and to natural causes and to special visitations of the gods; and as already noted, he postulated a spiritual essence universally diffused; this he called Nature. Physiology, and to this he ascribed the maintenance of things in their normal state, and their restoration if disturbed. The second period is headed by Aristotle, the father of natural history, about 350 B.C. He dissected many animals, and attempted to discover the use of the various parts. It is difficult to estimate correctly the exact value of Aristotle's work in physiology; it must be measured more by the method of research which he initiated than by the actual results achieved. Thus, to give an example of his ideas on the subject, the heart he imagined as the seat of the 'rational soul;' the nerves he supposed to arise in the heart; of their function he was ignorant. What is perhaps more surprising is that he described the brain as an inert viscous, cold and bloodless, whose only function was to cool the heart, and not comparable in importance to the other organs of the body. Erasistratus, the grandson of Aristotle, about 300 B.C., was perhaps the first to carefully dissect the human brain. He traced the sinuses and nerves with great accuracy, and found that the complexity of the convolutions of the gray matter was greatest in man, and that they were to some extent a measure of the intelligence. The next 400 years were barren of any useful advance; the practice of medicine reached perhaps its lowest point. The literature is occupied with discussions as to the 'animal and vital spirits,' terms used before Aristotle to express the powers of living things. The animal spirits were those that ruled over those actions of living things that were supposed to be quite different from anything that takes place in the body of a living, without the vital spirit. The vital spirits were those that were concerned in those processes going on in the body which were the result of purely chemical and physical laws. We no longer discuss whether the vital spirits live in the heart and the animal in the brain, but we have not yielded to the prejudice that the vital spirits are the essential of the living world and those of inorganic matter.

About 150 A.D. Galen, a Roman, revived the sounder method of experimental inquiry; he is the leader of the third period. He perceived that mere discourses were not sufficient to give an adequate explanation as to the functions of the living, and accordingly performed many experiments upon living animals. He proved that during life the arteries contain blood and not air, as was thought to be
accecptable by Darwin's work, is the great harmoniser of all science.

This history of physiology may be shortly summarised as follows. Even to early inquirers it was obvious that many of the life-processes of animals are the result of the action of a set of machines, which we know, are supposed to be, by a comprehending action of the 'vital spirits.' These machines were called organs, and the work performed was spoken of as their functions. The whole body was conceived of as made up of various organs, and the labours of physiologists were directed towards discovering the functions, a work which to this day is incomplete. This may be called the first phase of physiological philosophy; it lasted until the promulgation of the cell-theory and the rapidly following discovery of protoplasm. The idea of protoplasm is to natural science of nearly as much importance as the doctrines of the conservation of matter and energy are in chemistry and physics. The chief labours of physiologists for a very long time will be directed towards attaining exact conceptions of the nature of this protoplasm in terms of chemistry and physics. The old question of animal and vegetable, as to whether it is necessary, we are not able to say whether there is any abrupt distinction between ordinary matter and that which is called living matter, and which forms the physical basis of life. Is it merely that living matter is more complex and unstable than ordinary matter, and further that it is sensitive to external impulses in the form of ethereal and molecular vibrations; or is there some special vital force at work? If we fully understand the first theory we shall probably believe that there is no such vital force. At any rate, we are left to its discovery in determining how far the objective phenomena of life are explicable in terms of ordinary chemical and physical laws. When we find any activity of living matter which we can be certain cannot be so explained, then, and not till then, may we postulate a vital force. Supposing that a discovery ever to be made, it is necessary to observe that it will merely widen our chemistry and physics. The discussion of the subjective consciousness of life is an entirely separate one. Ordinary philosophy postulates two entities, matter and spirit; Materialism holds that the matter when it reaches a certain stage of complexity becomes conscious; Monism, which is becoming the fashionable scientific creed, teaches that matter in motion and consciousness are the two sides—one seen from without, the other felt from within—of a single entity.

We may utilise directly, as Foster's statement, of the present problems of physiology. He speaks of them as threefold. (1) On the one hand, we have to search the laws according to which the complex unstable food is transmuted into the still more complex and still more unstable living flesh, and the laws accounting to which the living substance breaks down into the simple, stable, waste products, void, or nearly void, of energy. (2) On the other hand, we have to determine the laws according to which the vibrations of the nervous substance are transferred to the viscera; and then the laws according to which these vibrations pass to and fro in the body, acting and reacting upon each other, and the laws according to which they finally break up and are lost, either in those larger swings of muscular contraction or in some other way. (3) And lastly, we have to examine the abstruser problems of how these neural vibrations, often mysteriously attended with changes of consciousness, as well as the less subtle vibrations of the contracting muscles, are wrought out of the explosive chemical decompositions of the nervous substance; i.e. how the energy of chemical action is transmuted into, and serves as the supply of that vital energy which appears as movement, feeling, thought.'

See, besides the articles named above and at Anatomy, those on Animal, Animal Chemistry, Animal Heat, Diet, Food, Death, Life, &c.; the elementary primer of physiology by Holme; the elementary textbook by Huxley; text-books by Foster (5th ed.), Landois and Stirling, McKendrick; Physiological and Pathological Chemistry, by Bunge, trans. by Woodrige (1890); Chemical Physiology and Pathology, by Halliburton (1891); Comparative Physiology and Anatomy, by Jeffery Bell (1897); Eng. Brit. article 'Physiology,' by Foster.

Physostigma. See Calabar Bean, the alkaloid of which is a valuable drug, is called Eserin or Physostigmin.

Physostomia. See Bony Fishes.

Phytelephas. See Ivy (Vegetable).

Piacenza, a city of Northern Italy, on the right bank of the Po, a little below its confluence with the Trebbia, by rail 43 miles SE. of Milan and 35 N.W. of Parma. Situated at the end of the Via Emilia and at the last convenient crossing-place eastwards on the Po, it has always been an important city of commerce and manufacture, since its foundation (as Placentia) by the Romans in 210 B.C. It is defended with bastioned walls and an outer ring of forts. Its streets are broad and regular, but many of them unfrequented and grass-grown. The cathedral, in the Lombard-Romanesque style (1122), is famed for its tower, which is 225 feet high, and paintings by L. Carracci, Guercino, and others. The church of Sunt' Antonio, the original cathedral, was founded in 324, but has been several times rebuilt. The church of Santa Maria della Campagna is adorned with fine frescoes by Pordenone, and in it San Sisto that Raphael painted the celebrated Sistine Madonna, sold in 1754 by the monks to Frederick Augustus of Saxony. Among the other buildings are the Palazzo Farnese (1558), once a sumptuous edifice, but since 1860 in use as barracks; the communal palace (1821). Its lower story built of marble and the upper of brick; the palace of justice, and others. A couple of miles to the east of the city is the theological seminary founded by Cardinal Alberoni. The municipal library contains 120,000 volumes. The town is adorned with colossal bronze equestrian statues of Alessandro and Rancuccio Farnese. Manufactures of silks, cottons, pottery, hats, &c, are carried on. The more notable facts in the history of Piacenza have been its capture by the Gauls in 290 and by Totila in 546, the meeting here of two church councils in 1095 and 1132, its active zeal as a member of the Lombard League in the 12th century, the sacking of it by Francesco Sforza in 1447, and its union with Parma (q.v.). Pop. (1897) 35,590.—The province has an area of 950 square miles, a pop. 290,000.

Pin Mater. See Brain.

Piana dei Greci, a town of Sicily, 10 miles S.W. of Palermo. It was the chief Albanian colony in Sicily in the 15th century.

Pianoforte (Ital. piano, 'soft,' and forte, 'loud'), a stringed musical instrument, played by keys, developed out of the clavicord and Harpsichord (q.v.), from which the pianoforte differs principally by the introduction of hammers, to pluck the strings in vibration, connected with the keys by a mechanism that enables the player to modify at will the intensity of the sounds; whence the name of the instrument. The invention of the pianoforte must be accredited to Bartolomeo Cristofori, a native of Pianu, who produced his instrument in 1714. Other claimants to the honour are a German harpsichordist, Johannes Schroeter, and Marius, a French harpsichordist.
chord maker. The first pianoforte seen in England was the instrument patented by Pianoforte by an English monk there. In Germany the invention met with more rapid encouragement and development than in Italy. The Silbermanns in Straßburg and Stein of Augsburg improved the discoveries of their countryman Schröter, and many Germans are found to maintain that the pianoforte is an independent invention indigenous to the Fatherland. In England the manufacture of the instrument was at first chiefly in the hands of foreigners, principally Italians. Italian pianoforte-makers opened many shops, but the English makers ultimately rivalled and surpassed the Italians. English pianoforte has been brought to its present state of perfection by Broadwood, Collard, Brinsmead, and others. Erard made many improvements in France; Germany has long been famous for its pianos, including those of Bechstein; and the American pianos of Steinway and Chickering are well known.

The commencement of the early pianoforte was, like that of the harpsichord, four to five octaves, and has gradually increased to seven octaves, or occasionally more. The most natural of the various forms which the instrument assumes is that of the grand pianoforte, which is derived from the harpsichord, with the strings placed horizontally, and parallel to the keys. The strings are stretched across a compound frame of wood and metal, composed of bars, rods, and strengtheners of various kinds—appliances necessary to resist the enormous tension. This framework includes a wooden sound-board. The mechanism by which hammers are connected with the keys is called the action of the instrument. In the earliest pianofortes the hammer was raised from below by a button attached to an upright wire fixed on the back-end of the key. The impulse given to the hammer caused it to strike the string, after which it immediately fell back on the button, leaving the string free to vibrate. This was called the single action. As the hammer, when resting on the button with the key pressed down, was thus necessarily at a little distance from the string, the effectual working of this action required that a certain impetus should be communicated to the hammer to enable it to touch the string. Hence it was impossible to play very softly, and it was found that, if the hammer was adjusted so as to be too close to the string when resting on the button, it was impossible to leave the string till after the blow had been given, thereby deadening the sound. This defect was remedied by a jointed upright piece called the hopper, attached to the back-end of the key, in place of the wire and button. When the key was pressed down the hopper, engaging in a notch in the lower side of the hammer, lifted it so close to the hammer that the lightest possible pressure caused it to strike; and at this moment, when the key was still pressed down, the jointed part of the hopper, coming in contact with a fixed button as it moved upwards, and the hammer fell clear away from the string. To prevent the hammer from rebounding on the string a projection called the check was fixed on the end of the key, which caught the edge of the hammer as it fell, and let the hammer fall clear away from the string. A necessary part of the action is the damper, which limits the duration of each particular note, so as to cause it to cease to sound as soon as the pressure is removed from the key. It consists of a piece of leather resting on the top of the string and connected with a part of the action by a vertical wire. When any key is pressed down its damper is raised off the string, so as to allow the sound produced to be clear and open; but immediately on the finger being lifted off the key the damper-wire falls, and the damper again presses on the string, muffling and stopping the vibration. The pianoforte possesses two pedals, the loud and the soft. By the former the dampers are raised, the result of which is to prolong the sound of the notes and cause them to run into one another. The employment of this pedal is designated by the word ped. written below the treble staff, while an asterisk is used to denote its cessation. The soft pedal, on the contrary, diminishes the sound, by removing a string from the impact of each of the hammers. Its employment in the music is denoted by the words una corda. One further frequent and important addition to the action may be alluded to. In the mechanism above described the key must rise to its position of rest before the hopper will again engage in the notch of the hammer for another stroke; hence a note cannot be repeated until time has been allowed for the full rise of the key. The repetition action is a contrivance, varying in different instruments, for getting rid of this defect by holding up the hammer at a certain height while the key is returning.

Great detail of the parts of the different makers. Some are more complicated than others; but in all are to be found the same essential parts, only modified in shape and arrangement. The subjoined figure represents one of the simplest grand pianoforte actions now in use. A is the key; B, the lever which raises the hammer; C, the hammer; D, the string; and E, the damper; F is the button which catches the lever after it has struck the hammer; G, the check; H, the damper pedal-lifter; I, the spring; and K, K, are rails and sockets. Formerly the strings of the pianoforte were all of thin wire; now the bass-strings are very thick, and coated with a fine coil of copper wire; and the thickness, strength, and tension of the strings all diminish from the lower to the upper notes. The grand pianoforte has three strings to each of the upper and middle notes, and now, generally, only two to the lower notes, and one to the lowest octave. When the soft pedal is pressed down the hammers are shifted sideways, so as to strike only two strings instead of three, or one string instead of two.

Besides the full or concert grand, there is the semi-grand or square piano with curtained key-board, now superseded by the cottage piano, of which the upright grand is merely a larger form. In the cottage piano the strings run vertically from top to bottom, and the formation of the sound in form necessitates alterations in the details of the action, but the general principle is the same. The pianette, a small form of the cottage, has also come into great favour. The pianoforte has attained a widespread popularity, owing chiefly to the fact that it can render harmonious though the violin is proving a serious rival to it in domestic circles. In England the manufacturers who have for some time past enjoyed the highest repute are Messrs Broadwood, Brinsmead, and Kirkman. Messrs Brinsmead have also introduced a patented pianoforte called the Sostenente, in which, by a number of hammers playing consecutively on a string, and so closely as to cause no interruption in the sound, any note may be sustained (whence the name sostenente) for an indefinite length of time,
and the same solemn and majestic effect may be produced upon the pianoforte which has heretofore been confined exclusively to the organ. The latest development to which the pianoforte has been carried is that introduced by an Austrian of the name of Janko. A great number of his pianos are now being made. Recognising the complete change which has passed over pianoforte music since the days when Mozart and Haydn wrote and, so to speak, created the literature of the instrument, Herr Janko has endeavoured to adapt the piano to the long stretches, chords, and difficult arpeggios which are the characteristics of modern playing, and were utterly unknown, or rather unemployed, in the days of the classical writers. Accordingly, he constructs his pianos with six keyboards, which rise in tiers above one another in the manner of an organ. The notes are so grasped that tenths and twelfths can be easily spanned by reaching a finger to a keyboard above or below that on which the hand is travelling; and, with a sweep of the wrist, which would scarcely cover more than two octaves on the old keyboard, an arpeggio can be executed through the whole compass of the piano's notes. The objections to Herr Janko's improvement come mainly not from the public but from the music publishers; for, while to a beginner on the instrument it is immaterial what system of fingering be adopted, publishers are naturally jealous of a new pianoforte which would render useless and compel complete remodelling not only of all the fingering, but perhaps of the stuff.

Music for the pianoforte is written in two staves, and with the treble and bass clefs. Many of the most eminent musicians have devoted themselves to composing for the pianoforte, and some composers of note, as Hummel, Chopin, Thalberg, and Heller, have almost entirely confined themselves to that instrument. Amongst the greatest modern pianists have been Madame Schumann, Liszt, and Rubinstein. See Rimbaud, The Pianoforte (1860); Grove's Dictionary of Music and Musicians; and the histories of music and of musical instruments (such as Hopkins's Musical Instruments, 1887).

Pianists, or ' Fathers of the Pian Schools,' are religious congregation for the education of the poor, founded at Rome in 1617 by a Spanish priest, Joseph of Calasanza, and continued in 1621 by Gregory XVI. They were chiefly active in Poland and Austria.

Piasaya. See FIBROUS SUBSTANCES.

Piastra (Gr. and Lat. emplastron, ' a plastron,' in the Romance languages, anything spread out or flattened, ' a plate,' ' a coin '), an old Spanish silver coin worth about 4s. It was divided into 8 silver reals, and hence was termed a piece of eight, the name invariably applied to it on the Spanish Main (see DOLLAR). The Italian piastre, or svasta, was an imitation of the Spanish coin, and was nearly equal to it in value. The Turkish piastre is a silver coin worth about 2d. in English reckoning and 4 cents in United States currency. Usually 25 piastres = £1 sterling and 100 = 20 francs. The lira contains 100 piastres. Pieces of 1, 2, 5, 10, and 20 piastres are struck in silver.

Platigorsk, a town in Russian Caucasia, at the southern foot of Mount Beshtan (4387 feet), facing Mount Elbrus, and at the base of the Caucasus Mountains, and 324 miles by rail NW. of Vladikavkaz, is celebrated for its sulphur-springs. Rising from 83.7° to 117.5° F., in temperature, they are useful for abdominal and rheumatic affections. Pop. 13,660.

Platres, a town of Moldavia, 60 miles W. by S. of Jassy, romantically situated on the Dristiza, at the (eastern) foot of the Carpathians, has a trade in timber and a pop. of 13,800.

Piazza (more fully Piazza Armerina), an episcopal town of Sicily, 16 miles SE. of Caltanissetta. Pop. 17,038.

Piazzini, Giuseppe, Italian astronomer, was born at Ponte in the Valtelline, July 16, 1746, and entered the order of the Theatins at Milan in 1764. After holding professorial chairs of Philosophy, Mathematics, and Theology, at Padua, Ravenna, and Rome, he was appointed in 1789 to the chair of Mathematics in Palermo; and there, with the aid of government, he established an observatory in 1789. The first task he set himself was to make a chart of the stars, published in 1803, and again extended in 1814. On the night of the 1st January 1801 he discovered a new planet, the first of the group of planetoids between Mars and Jupiter, and named it Ceres. He died, 22d July 1826, at Naples.

Pibroch (Gaelic, Piobaireachd, ' a pipe tune '), a form of bagpipe music, generally of a warlike character, including marches, dirges, &c. According to Sir Walter Scott, connoisseurs in pipe-music affect to discover in a well-composed pibroch the imitative sounds of march, conflict, flight, pursuit, and all the current of a heady fight. The rhythm is very irregular and difficult for a stranger to follow, but when played by a good piper it has a very powerful effect. The earliest mention of the military music of the bagpipe is in 1594 at the battle of Glenlivet, but the various pibrochs belonging to the different clans are mostly of modern composition.

See Macdonald, Ancient Martial Music of Scotland (about 1805); Mackay, Collection of Ancient Piobaireachd, or Highland Pipe Music (1838); and Ossian's Collection of Piobaireachd.

Picardy (Picardie), an ancient province in the north of France, was bounded on the W. by the English Channel, and on the E. by Champagne. The capital of this province was Amiens. The territory now forms the department of Somme, and portions of the departments of Aisne and Pas-de-Calais.

Picaresque. See NovELS.

Pleauyme, a name derived from the Carib language, and used in Louisiana for a small coin worth 6½ cents, and current in the United States before 1837, and known in different states in various names (fourpence, lippence, lip, sixpence, &c.).

Piccolo. See FlUTE.

Piccolo'mini, an old and distinguished family of Italy, settled at Sienna, who subsequently obtained possession of the duchy of Amalfi. It produced numerous celebrated literati and warriors, one pope (see PIUS II.), and several cardinals. One of the most illustrious members of this family was Ottavio, Duke of Amalfi, born in 1599. He entered the Spanish military service, and being
sent to aid the Emperor Ferdinand II., fought against the Bohemians at the battle of the Weissemburg (1620), then in the Netherlands, and after that in Wallenstein's army at the Lützen (1632). He was one of the chief agents in effecting the fall of the all-powerful general, by betraying the secrets of his plans. He then began to Distinguish himself in the battle of Nördlingen (1634). In the following season he was sent to aid the Spanish in the Netherlands, and speedily drove out the French, but had not much success against the Dutch. He was with the imperial emperor in 1643 to see the Swedes, who, under Baner, were threatening the hereditary possessions of Austria. This purpose he accomplished; but, though he was successful against these northern invaders in the Palatinate, he was worsted in Silesia by Torstenso. Returning to the Spanish service in 1643, he was sent again to the Netherlands to take the command of the Spanish troops. But his success was not nearly so decisive as before, the prestige of the Spanish infantry having been destroyed by Condé at Rocroi (1643). After the signing of the peace of Münster (1648) Piccolomini was created a field-marshal by the emperor, and was sent as plenipotentiary to the Congress of Nuremberg (1649). He died at Vienna, 10th August 1656, leaving no children; his son Max, who figures in Schiller's Wallenstein, is only a poetical fiction.

Pic du Midi, a summit of the Pyrenees, 9466 feet high, in the south-east corner of the French department of Basses-Pyrénées.

Piccolomini, CHARLES, French general, was born a labourer's son at Arbois in Jura, 16th February 1761, and was educated by the Minorite friars at Arbois and at the college of Brienne. He enlisted into an artillery regiment in 1783, and showed such capacity and courage on the Rhine in the fiery service of the young republic that by 1793 he was a general of division. In October of that year he was given supreme command on the Rhine, and in conjunction with Hoche and his army of the Moselle he drove back the Austrians, relieved Landau, and overran the Palatinate. Next year he continued his career of triumph in the Netherlands, and showed in three campaigns within one year consummate generalship and a fortunate audacity worthy of the great Napoleon. After by swift movements defeating the Austrians in detail, he broke their forces at Fleunrs, June 27, 1794, and, continuing the struggle into the winter, crossed the Meuse and the Waal on the ice, entered Amsterdam, and 20, 1795, and soon occupied the whole of Holland. During this campaign occurred the famous capture by the French hussars of the Dutch ships frozen in the Helder. Recalled to Paris by the Thermidoriens, the "Sauveur de la Patrie" cursed an insurrection of the fanatiques at Paris and was removed to the Bastille and took Mannheim. But at the height of his fame he turned traitor, and sold himself for vast promises to the Bourbons. With deliberate treachery he remained inactive before the enemy, and allowed Jourdan to be defeated. The Directory becoming suspicious superseded him by Moreau, and Piccolomini retired to Arbois. In 1797 he took his place, first as member, next as president, of the council of Five Hundred, and continued his Bourbon intrigues, but on the 18th Fructidor (4th September) he was arrested and deported to Cayenne. Escaping in the June of 1800, when he made his way to London, was attached to the Austro-Russian army in 1799, and thereafter lived in Germany and England until the formation of the Bourbon conspiracy of Georges Colonial (q.v.) for the assassination of the First Consul. The pair reached Paris secretly, but found it impossible to gain over Morean. They were soon betrayed to the police, and Piccolomini was seized in bed and carried to the Temple, February 28, 1804. Here, on the morning of the 6th April, it was found that he had anticipated justice, and ended his dishonoured life with a sword. He must be credited that he had justly forfeited his life to his country's laws, and there is no justification for the royalist slander that he was made away with by Napoleon.

See the Lives by Gasnier (1814), Pierret (1826), VouZiers (1758); also the Mémoires by Montsallier (1804).

Picchiago. See Chlamyphores.

Picchina (belling mountain), the most populous province (2,205,000 in 1896) of Ecuador, embraces the Quito plateau and its slopes. Area, 5300 sq. m. The soil is fertile in the west. The province takes its name from the active volcano of Picchina, 8 miles N.W. of Quito, the chief town, it has five peaks, two of which (15,018 feet) Mr Whymper ascended in 1880. The enormous crater, nearly a mile across at the top and perhaps 1500 feet in diameter at the bottom (which is 2500 feet below), is said to be the deepest in the world.

Piclier. KAROLINE, novelist, was born 7th September 1793, at Vienna, her maiden name being Greiner; and between 1800 and her death, 9th July, 1843, wrote several novels and a novel and collected a edition of 60 volumes, of which the most notable are Agathokles (1808), Frankenuerde (1818), and Die Belagerung Wien (1824). Her autobiographical Denkwürdigkeiten (1844) fill 4 vols.

Pickering. See Pike.

Pickering, a market-town in the North Riding of Yorkshire, 32 miles N.N.E. of York. It has a fine ruined castle, which was Richard II.'s first prison, and was dismantled by the Roundheads, and an interesting parish church. Pop. (1881) 3931; (1891) 3067.

Pickles, a term generally applied to vegetables preserved in vinegar, with or without spices; though pickled applies to animal food preserved in salt (see Preserved Provisions). The vegetables most pickled in Britain are cabbage, cauliflower, gherkins or young cucumbers, French beans, onions and eschalots, walnuts, mushrooms, and mastur- bunmus. Piccalilli or Indian pickle is made of lemons or cauliflower, mustard, and flower of mustard. For the methods of preparing pickles reference must be made to a cookery-book. Capers (q.v.) are imported; also olives preserved in brine and in vinegar, and several preparations of the mango fruit. The food value of pickles as a con- diment is touched on at Diet, Vol. III. p. 869; and for adulterated pickles, see Adulteration.

Pico. See Azores.

Pico della Mirandola, one of the most curious figures in the history of the Renaissance, was born in 1463, and was the son of Francesco Pico, Count of Mirandola, and Concordia in the Modenese. He was a wonderfully precocious boy, and in his youth he visited the chief universities of Italy and France. In 1480 he issued a challenge to all comers to engage him in critical discussion at Rome, but the debate was forbidden by the pope on the score of the heretical tendency of certain of the nine hundred theses which Pico had offered to maintain. An Apologia which he issued in his defence was considered scandalous until Alexander III. In 1493 absolved him of the charge of heresy. He spent much of his life in travelling, and became known as a generous benefactor of the poor. He was an intimate friend of Politian and Lorenzo de Medici. He died of fever in 1494, and Savonarola, who had been anxious to enrol him among the Friars Preachers, vowed him
after death in the habit of the order. Mirandola was the last of the schoolmen. He endeavoured to reconcile the Catholic theology with medieval philosophy, and his works are a bewildering compound of mysticism, scholasticism, and recondite knowledge. He interpreted the Mosaic text by the Cabalistic and Pythagorean as well as to the Apothecary; he exhibited, along with a childlike credulity, a argumentative ingenuity worthy of the subtlest schoolman. He was a humanist as well as a theologian, and was the author of various Latin epistles and elegies and of a series of florid Italian sonnets. His writings are of little value, but the magic of his personality survives. A theologian and an erotic poet, a philantropist, a scholar, and a traveller, an adherent at once of Duns Scottus and of Politian, he was one of the most chivalrous, generous, and versatile of men; his character is as engaging as it is curious and cosmopolitan.

See G. P. della Mirandola, his life by his nephew (trans. by Sir Thomas More; Nutt, Lond. 1890), and Pater's Studies in the Renaissance.

Picotee. See Carnation.

Picquet. See Piquet.

Pierce Acid (Trinitrophenol), C₆H₂(NO₂)₃OH. This substance appears in the form of pale yellow crystals, obtained by the action of nitric acid on phenolsulphonic acid. Equal parts of phenol and concentrated sulphuric acid are mixed together, and placed in a suitable vessel, which is heated till the mixture reaches 212° F. (100° C.). Nitric acid of the specific gravity 1.3 is then added. On cooling, a crystalline mass is produced which is filtered and drained. A washing with cold water follows, and then the picric acid is further purified by recrystallising it from water containing a small proportion (0'1 per cent.) of sulphuric acid. Picric acid is easily soluble in hot, but only slightly in cold water. It is also soluble in alcohol and ether. Its taste is intensely bitter, and its toxicological power is very great, the solutions of it having a strong yellow colour (see Dyeing, Vol. IV, p. 141). It has been much used for dyeing silk, wool, and leather. As it does not adhere by itself to these fibres, it serves for a test to distinguish cotton from wool or silk. The presence of cotton in a mixed fabric can therefore be detected by steeping it in a hot solution of the acid, and afterwards washing it. Then, with the aid of a microscope, the difference between the wool or silk, both of which retain the dye, and the cotton, which does not, will be made clear. The salts of picric acid are a very important ingredient in explosives (see Melinite, Gun-Cotton, Shell). It was formerly called Carbazotic Acid.

Picrite, one of the peridotites or olivine rocks. It is usually olivine, but the other principal minerals are augite and plagioclase. Magnebite or hibonite, or both are generally present. Biotite occurs not infrequently, and apatite occasionally. The rock is often more or less altered into serpentine.

Picts. ADOLPHI (1799-1875), a native of Geneva, and a writer on the Celts and the primitive Aryans. To the same Genevese family belong Marcus Auguste Picquet (1752-1825), physician; François Jules Picquet (1800-72), zoologist and palaeontologist; and Raoul Picquet, chemist and physiologist, known in connection with the invention of oxygen.

Picton, SIR THOMAS, British general, was born in August 1758, at Poyston in Pembrokeshire, entered the army as ensign in the 12th Foot in 1772, and two years later joined his regiment at Gibraltar. In 1794 he went out to the West Indies, and was given a command under Sir John Vaughan. He took part in the conquest of several islands of the West Indies, including Trinidad, and was appointed (1797) governor of one of the islands. Shortly afterwards he was raised to the rank of general. In 1803 he was superseded, but immediately after appointed governor of Tobago. He found it necessary, however, to return to England, to take his trial on a charge of forgery permitted, under the old Spanish laws, a female prisoner to be flogged. He was found guilty of sanctioning unlawful torture; but on appeal he was in a new trial acquitted. He saw active service again in the Walcheren expedition (1809), and was made governor of Flushing after its capture by the English. Early in the following year he was summoned to Spain, and put in command of the ' Fighting Division,' and with it rendered brilliant service at Buena, during the subsequent expulsion of the French from Portugal, at Fuentes de Onoro, at thepasses of Ciudad and Pintido, and in Portugal, and in the battles of the Pyrenees, at Orthez and before Toulouse. Napoleon's escape from Elba once more called Picton into the field; he fought at Quatre Bras and was wounded, but kept the fact hidden that he might not miss the great day he saw coming. He fell heavily in the battle of the charge at Waterloo, 18th June 1815. See Memoirs of Sir T. Picton, by H. B. Robinson (2 vols. 1835).

Picton, a port of entry on the north coast of Nova Scotia, on a large and sheltered harbour, 85 (by rail 114) miles N.N.E. of Halifax. The town contains several mills and factories, and coal, mined in the vicinity, is exported. Pop. (1891) 2999.

Picts. This is the name by which, for five and a half centuries (296-844 A.D.), the people that inhabited eastern Scotland from the Forth to the Pentland Firth were known. In the Irish chronicles they are generally styled Picti, Pictiones, Pictores, or Piccardi— all forms of the same root; but sometimes the native Gaelic name of Cruithing is applied to them, and their country is called Cruithin-tuath, the equivalent of Latin Pictavia and Old Norse Pictah, which is the name of the Pentland Firth. There were Cruithin or Cruithing also in Ireland—never, however, called Picti. They formed the petty kingdom of Dál-ariain (County Down and part of Antrim) and bordered on the Irish Dalriada; and the state of both these provinces was contemporaneous with the whole extent of Pictish rule, much confusion is thereby caused as to what refers to Scotch and what to Irish Cruithing in the annals. Other Irish Cruithning appear sporadically, not to say enigmatically, in Moot and in Roscommon. There does not seem to have been any difference in language and customs between these Irish Cruithing and the rest of the people of Ireland, at least in historic times. They were probably early invaders from Britain belonging to the Picts.

The Picts are mentioned in connection with the campaigns of Constantius Chlorus in Britain in 296 and 306. Emmenius, his panegyrist, speaks of 'Caledonum aliorumque Pictorum silvas et paludes' (the Caledonians and other Picts), which he signifies the name of the forefathers of the northern people. Caledonia is the name given by Tacitus to Scotland north of the Firths of Forth and Clyde, and he describes the Caledonians as a noble race of barbarians, who fight in chariots as well as on foot, with long swords and short shields, and whose fair red hair and large limbs argued a German origin. Ptolomy (120) places fourteen tribes in Tacitus' Caledonia, inclusive of the Caledonians
themselves, and the more easterly ten of these may be claimed as Picts. So troublesome were these northern tribes to the Roman province that in 209 the commander of Britain, who was said vainly attempted their subjugation. The contemporary historians mention only two tribes north of the Forth and Clyde wall—the Maccate and the Caledonii—andTacitus' noble barbarians appear in their pages but squallid savages, having no cities, knowing no agriculture, possessing wives in common, and tattooing their bodies with pictures of all kinds, to show which 'they wear no clothing,' says Herodian. Yet they have chariots and weapons as described by Tacitus, with dicker and peculiarly knobbled spear. One hundred years later the Caledonians and other Picts, as already said, are encountered by Constantius, and still fifty years later they are harassing the Roman province (300) now in company with the Scots, who are first mentioned at this date, and who appear as great sea-wanderers, starting from Ireland and Scotland both, it would seem, and attacking the whole seaboard of the province, especially Wales. The Picts and Scots are helped in this 'continual vexing' of the Britons by the Saxons and Aetecotti. The Picts are represented at this time as divided into two nations called Dianili and Vercinienses, or rather Vercinienses, to accept Professor Rylai's happy emendation of Ammianus' text, for this latter form may be identified with the historic Fortrem (Strathern and Menteith). Theodosius the elior in 389 subdued these northern foes and restored the district between the walls to Roman Britain, and the usurper Maximus signalised his assumption of power in 383 by an energetic campaign against the Picts and Scots. During the next quarter of a century the Romans were losing their hold on Britain, and their northern foes pressed on the province with great persistence. First the northern wall was rebuilt, then abandoned; and hostile the southern wall was repaired by the last legion sent. In vain did the brave Stilicho gaze on the 'figures fading on the dying Pict,' as Claudian says, for they burst on the Britons. Britain with more force than ever, in the reign of the saxons against the Picts and Scots made the last state of the Britons worse than their first.

At this point the light of Roman history is withdrawn from us, and we have to depend on vague references in native writers. Gildas of Wessex, in his 'Wwards of the Wicked and the Good' (794), on Beda (781), on Nennius (9th century), and on the Irish and other annalists of the middle ages, the best of whom is Tinternach (1085). There is a Pictish Chronicle, perhaps composed in the 10th century, but preserved only in a MS. four hundred years later in date. Gildas describes the Picts and Scots as 'differing somewhat in manners,' and 'surrounding their villainous faces in bushy hair rather than clothing' their lower limbs. Bede points out that the Picts are divided into a southern and a northern division by the Grampian hills. They were converted to Christianity by St Ninian (circa 400), and the northern Picts over a century and a half later by St Columba. Bede also notes and mythically explains the system of succession among the Picts, whereby the reigning monarch was succeeded by his eldest son, but if his eldest son died before the age of twenty, his brother's son or his eldest daughter from his sister's son, descent being counted through the females. This curious rule is amply confirmed by the Pictish list of kings. Scotland in Bede's time, and for more than a century previously, was divided among four nations: the Saxons and Britons were south of the Grampian hills, the Picts east of Drumallan, and the Scots to the west with Dalriada or Argyllshire as their head centre. The annals say little of the Isles and north-west coast, whether they were held by Scots or Picts, though subsequent history makes it clear that both succeeded for a long period. The invaders of Canun in 501 were but the last of many Scotic invaders and colonisers. That the four nations of Bede's day spoke four different languages is clear from his oft-repeated statement to that effect, and his handing down a word in this Pictish tongue (parfain) by the name of Columba. Ammianus, and to employ an interpreter twice in describing the Picts, while Corunc of Cashel mentions a word (cartit) belonging to the bertha eruithech or Pictish language.

In the ninth year of the reign of Brude MacMicheal, the year 653, Columba set out to attempt to convert the Picts. Brude had his royal residence near Inverness, and was 'a most powerful king,' Bede says, for he represents him as granting Lona to Columba, though Tignernach says that Connal of Dalriada made the gift. But the Picts were carrying on war among the Isles at the time, as the life of St Columba shows, and Brude had hostages from the king of the Orkneys. Brude's successor, Gartnaith, seems to have fixed his capital at Alnethy, the church of which he founded. The Picts were subjugated by Oswald, King of Northumbria, and his tributary, soon after, Reubin in 654. Thus the Picts remained under the Anglian yoke for thirty years; but Brude, son of Bile, asserted his rule among the northern Picts, and meeting the Anglian king Egfrid at Dunsinane in 685 defeated and slew him, and thus ended the Anglian rule over the Picts. About 710 Nation or Nectan, son of Derick, King of the Picts, and as Bede tells us, he conformed under Anglica influence to the Roman Church in regard to the celebration of Easter, going indeed so far as to expel recalcitrant Columban clerics across Drumallan. Following a custom not infrequent at the time, Nectan resigned his throne and became a cleric. A fierce struggle ensued for the throne, during which Nectan emerged from his monastery, but eventually Angus, son of Fergus, petty king of Fortrem, crushed all his rivals and reigned for thirty years, when this 'v�reme tyrant' died 761. His brother Brude died king of Fortrem in 763, for evidently Angus' monarchy had collapsed and the provincial kings again came to the front. Unfortunately the next eighty years of Pictish and Scottish history is exceedingly difficult to unravel, owing to the want of lists of kings and a reformer or two in the Annals of Ulster are all the material which is to hand. Ciniud was king after Brude, but his rights were disputed by Aed of Dalriada; and after his death in 774 there is much confusion in the Chronicles, as there must have been in the facts. Dalriadic princes struggle with Pictish princes and with one another for the throne, till Constantine of Dalriada established himself about 815 as king over both. His and his brother's reign ended in 834, and a time of confusion followed, native Pictish princes striving against Eoganan of Dalriada, son of the former. Pictish kings were in 839, which ended his reign, saw a great defeat and slaughter of the Picts by the Danes, with confusion once again, from which emerged in 844 Kenneth MacAlpin, the Scot, as king over both nations, henceforward not to be disputed. Many things indicate the great contrast in the western kingdom, such as it was, and of the Pictish language: the distinction, physical and otherwise, between northern and southern Picts; the rule of female succession which allowed Anglica Briton, and Scotic princes to rule in right of their mothers, with the consequent daughter were preferred to the son; matriarchy implies; and the superior culture of the Scots, Christian and literary. Nor must it be forgotten that we really do not know much about
the Jales and west coast north of Argyll, nor indeed of the counties north of Inverness, from the time of Brude MacMailchon till the Norsemen came. It is quite certain that the Scots colonised these very early, and had, indeed, established themselves in Perthshire. Aidan, the son of Gubhir, makes expeditions to workmen in the Picts and druidics among them on the Forth, or even farther eastward, in Mearns. This aggressive energy, combined with the other facts of the situation above enumerated, would easily enable the Scots to supersede the Picts in power and language.

It can now be part of the question what the language was which they spoke. This question must not be confused with another if allied one, What race did the Picts belong to? The Picts may have spoken a Celtic language though racially possessed of little Celtic blood, and may have retained non-Celtic customs as survivals of a lower culture, as indeed they did in the case of female succession. Four hypotheses have been formed in regard to the language and origin of the Picts. The first, started by Pinkerton and put by Sir Walter Scott into the mouth of the 'Antiquary,' is that the Picts were a Celtic-Frisian-Pictish-Gothic dialect; the second, maintained by Dr Skene, is that they were Gaelic-speaking Celts, and that they and not the Scots finally conquered in the 9th century; the third, due to Professor Rhys, is that the Picts were non-Aryans, whose language was one of the Jales, and known by that name; the fourth, held by two of the most eminent Celtic scholars of the day, Professor Windisch and Dr Whitley Stokes, is that they were Celts, but more nearly allied to the Cymry than to the Gaeil.

The materials for deciding the linguistic relation of the Picts to the modern Celtic-speaking nations consist almost entirely of names—those in the classical writers, in the king lists, and in the Book of Deer, and the still or lately extinct place-names of ancient Pictavia. The main agreement between the Gallo-Cyriic and Gaelic languages is their dropping of Arvan initial p; their main difference is their developing the labialised guttural gh— the one like the Greeks into p, and the other, the Gaelic, like the Latins into g or c. This fact led Professor Rhys to call them respectively P Celts and C Celts from Scotia and the Irish branch of the Celtic family. So, in the Gallo-Cyriic language the name Picti, which was usually regarded as the Latin for 'painted men,' is now considered inseparable from Pictiones or Pictavi of Gaul, now Poitou, and is therefore Celtic of the P group. An old Gaelic equivalent is supposed to be the name of Deir den Dubh in the Gelasian Psalter. The idea of 'painted or pictured men' intact. Further, the Gaelic name cruthin is derived from cruth ('form, figure'), Welsh pryd; and the Welsh name for Pict is actually Pryllon. The form Prettanica, undoubtedly used by the best Greek writers for the Latin Iucania, makes it possible that the Cruthinig gave their name to Britain. The meaning of Bede's Pictish word pienfæblh is practically explained by himself as Wall's Head, where pneu, with its p, answers to Welsh penu ('head') and not to Gaelic cean. Similarly Pern and paut in the king lists. It is not certain that meaning striking still is the pelt of the Book of Deer, which signifies a portion of land, corresponding to Welsh peth, and etymologically to Gaelic eitl ('portion'). Pet or pat is a prefix in place-names in Gaelic; and the football of the Forth at the present day, some two hundred being easily counted, although the Gaelic Bal has considerably extruded it in western Pictland. It is similar to aber as a place-name prefix, which is found all over Pictland. This is the Abber or Apar of the Pictland from Scotia and the Cynric to the Earth-houses (q.v.). The Brosch (q.v.) are also sometimes called Pictish Towers. For the Picts' Work, see Caractacus,

Picture-painting. See REHOGlyphics.


Piece of Eight. See PIStRE.

Piedmont, or PIEDMONT (Fr. pied, 'foot, mont, 'mountain'), a former Italian principality, which now forms the north-west part of the kingdom of Italy, is by the Alps separated from Switzerland on the N. and from France on the W.; on the E. lies Lombardy, and on the S. is Signa, to which the old duky of Savoy is attached. It included the duchy of Monferrat and part of the old duky of Milan, and now embraces the provinces of Alessandria, Cuneo, Novara, and Turin, and covers 11,389 sq. m., with a pop. (1889) of 3,297,157. For an account of its geographical features, see the preceding century. The 12th century the name Piedmont was used as a collective title for the territories ruled over by the House of Savoy on the east side of the Graian and Cottian Alps; the history of the region will be found under ITALY, SARDENIA, SAVOY, and WALD. See, too, Butler's Alps and Sanctuaries of Piedmont (new ed. 1890).
Piepowder Court, in England, an ancient court held in fairs and markets to administer justice in a rough and ready way to all comers, called also the Court of Dusty Foot (Old Fr. plied pointev). Its jurisdiction seems to have been confined mostly to petty vagabonds, pedlars, and other wanderers. It has since been obsolete, and its jurisdiction merged in the court of Petty Sessions (q.v.).

Pierce, Franklin, fourteenth president of the United States, was born at Hillsborough, New Hampshire, November 23, 1804. His father, Benjamin Pierce, a farmer who had risen in the war of independence to the rank of major, in 1827 and 1828 was a member of the New Hampshire legislature. Pierce was educated at Bowdoin College, and was an officer in a college military company, in which his biographer, Nathaniel Hawthorne, was a private. He graduated in 1824, studied law, and was admitted to the bar in 1827. From 1829 to 1833 he was a member of the legislature, and for two years was its speaker; he was then elected to congress, a Democrat of the school of Jackson. In 1837 he was elected to the United States senate, of which he was the youngest member. In 1842 he resigned his seat, and returned to the practice of law. In 1846-47 he was elected to the House of Representatives, and in 1849 returned to the Senate. As senator he represented the New England States and Illinois, while his major interests were the Mexican War, with which he was not, after his opponents, the Whigs and Free-soilers, had been victorious at the polls in 1846, volunteered as a private for the Mexican War. The president made him a brigadier-general, and in August 1847 he joined General Scott's troops in the vicinity of Vera Cruz and Churubusco. In 1852, in consequence of the conflicting claims of the leaders of the Democratic party at the Baltimore Convention, he was nominated as a compromise candidate for the presidency, against General Scott, the Whig nominee. He received the votes of all but four states. President Pierce in his inaugural address defended, on constitutional grounds, slavery and the Fugitive Slave Law; and his cabinet, which was an eminently able one, included Jefferson Davis as secretary of war. Pierce's view as to slavery was that it was inherent in the Constitution, and he framed bills to enforce the federal constitution, and that, therefore, in honesty it must be maintained. The principal events of his administration—in importance far before the treaty for reciprocity of trade with the British American colonies and the treaty with Japan, or the filibustering expeditions of Walker (q.v.) to Nicaragua, and of others to Cuba, with the resultant abortive Ostend (q.v.) Manifesto—were the repeal of the Missouri Compromise (see Missouri) and the passing of the Kansas-Nebraska Act (see Kansas), which kindled a flame of civil war. The subject of slavery was the subject that ultimately set the whole Union in a blaze. Pierce, with his rigid regard for constitutional obligations, was intensely hostile to the free-state settlers and to abolitionists in general. At the close of his term of office in January 1861, he went at once to Europe, and afterward, having no sympathy with the party which subsequently came into power, he took no part in politics. He died at Concord, 8th October 1869.

Pieria, a coast district of ancient Macedonia, at the base of the Olympus, and between the Penens and Haliacmon. It was the fabled birthplace of the Muses and of Orpheus.

Pierre, a city, capital of South Dakota, is on the Missouri River, 116 miles by tail W. of Huron. It has a pop. of about 12,000. Here are also situated a central office of the Mound City Railroad, and a government industrial school for the Indians. Pop. (1900) 2386.

Pierson, Henry Hugo, composer, was born at Oxford in 1815, in 1844-45 filled the chair of Music in Edinburgh, and from 1846 lived in Germany, dying at Leipzig, 28th January 1873. Among his works were the music for the second part of Goethe's Faust, an oratorio of Frere, and the oratorios Jerusalem and Hezakiah.

Piers Plowman. See Langland.

Pietà (an Italian word signifying pity, in the sense in which that term indicates or includes affection for relatives), the name given in the language of art to representations of the Virgin Mary embracing the dead body of her son. It is a counterpart to the Madonna with the infant Jesus in her arms.

Pietermaritzburg, or Maritzburg, capital of Natal (q.v.), occupies a fine situation near the Umsunduzi river, 54 miles N. of Durban, and 2218 feet above sea-level. The chief buildings are the Legislative Assembly buildings, Government House, the Colonial Offices, Town-hall (rebuilt 1890, after being burnt), the supreme court, the post-office, railway station, police barracks, &c. Fort Napier, the head-quarters of the imperial troops, overlooks the city from a hill on the south-west. There is a college library and museum, asylums, a park, botanical gardens, &c. The city takes its name from its founder, Pieter Maritz (1830-1885), the Boer leader. Pieter Retief and Gert Maritz. There is railway connection with Durban, with the Orange Free State, and with Johannesburg and Pretoria in the Transvaal. The place has steadily increased in importance with the development of the colony, especially since the establishment of the railways. Pop. (1887) 13,767; (1898) 34,593, about half whites, the rest Kaffirs and Indian coolies.

Pietists, a designation given at the end of the 17th century to a religious party in Germany, which, without forming a separate sect, was distinguished rather by fervour and zeal than by peculiarities in doctrine or religious organization. See History, Vol. III. p. 240, the articles on Spencer and Francke; and the Histories of Pietism by Hepp (1879) and Ritschl (1880-86).

Pietra-Dura, a name given to the finest kinds of Florentine mosaic-work, in which the inlaid materials are hard stones, such as Jasper, Carnelian, and others, with agate.

Piezometer (Gr. πιεζω, 'I press,' metron, 'a measure'), an instrument for measuring the compressibility of fluids, by observing the extent to which an air-bubble which marks the upper level of liquid in the capillary neck of a flask is depressed by the application of an external pressure acting through liquid surrounding the flask.

Pig, or Hog (Sus), a genus of artiodactyle ungulate mammals, of the family Suidae (see Boar), where the characteristics of the wild species are discussed, with an illustration). The term Swine is commonly applied to the genus in Britain. The body is covered more or less with bristles and hair; the skin is very thick; the limbs short and stout; the neck, which is carried straight forward from the trunk, is very thick and strong; the face moderately prolonged and truncated, always terminating in a movable cartilaginous disc, furnished, as in the mole, with a special small bone, and employed with wonderful expedition in
turning up the soil in search of roots and other food. In most of the improved varieties the face is much shorter than in the wild boar or ancient pig. There are six incisors, two canine teeth, and fourteen molars in each jaw, the lower incisors projecting forwards; the canine teeth long and strong, projecting and curved, becoming in Chinese and African species long and sharp tusk-like weapons in wild boars, and large and powerful even in the females in a wild state. The feet have each four toes, the lateral ones small, and scarcely touching the ground, all separately hoofed. The tail is short. The stomach shows more traces of division. The food is chiefly vegetable, but pork or beef no more animals may more properly be called omnivorous; and although, even in a wild state, pigs are not to be reckoned among beasts of prey, they are not unfrequently, even in domestication, kill and eat small animals that come in their way, as many a housewife has had occasion to observe in respect to chikens. The Common Pig (S. scrofa) appears to be a native in the wild form (see Boar) of most parts of Europe and Asia; the domestic European breeds are apparently descended from the European wild boar, crossed with domesticated Asiatic breeds. Like the other thick-skinned animals with which it is allied—the elephant, rhinoceros, hippopotamus, and tapir—the pig delights in humid and shady open places. The pig usually grows until five years old. Its natural life ranges from fifteen to thirty years. The pig, like the wild boar, was prohibited to the Jews, and the prohibition has been adopted in the Mohammedan law, the pig has been a domesticated animal from a very early period, and its flesh constitutes a large part of the food of many nations. The fecundity of the pig is great; with proper treatment it will produce two litters annually, generally of four to eight pigs each, although sometimes there are as many as fourteen in a litter. Vast quantities of the flesh are consumed in various forms, as pork fresh or salted, bacon, ham, &c. Brawn (q.v.) is an esteemed luxury. The fat of the pig, which is produced in a thick layer under the skin, is an important article of commerce, and of various use under the name of Lard (q.v.). The skin of the pig is made into leather, which is particularly esteemed for saddles. The bristles, especially of the wild boar, are much used for brushmaking. Indeed, there is no food-producing animal which is of greater benefit to mankind than the pig.

There are numerous varieties of the domestic pig. Some have erect and some pendant ears, and those are most esteemed which exhibit the

of the breeds commonly reared in Britain, giving rise to the improved white and black breeds respectively. The Chinese breed is renowned for its fertility, as well as for the rapidity with which, without materially increasing in offal or bone, it lays on flesh. Its head is short and thick, ears erect, legs very short, and the chine—chop—five inches long, jowl wide, belly hanging very near to the ground. As a rule it carries a small quantity of hair. The skin isnaturally dark, but the flesh is delicate and white. These valuable characteristics distinguish the improved Yorkshire pigs, which are much esteemed all over the British Isles as well as in several foreign countries. The Neapolitan breed is entirely black, with little hair, moderately short in the face, ears small and erect, short in the leg, moderately long and thick in the body, remarkably easy to fatten, but scarcely so robust in constitution or so prolific as the Chinese pig.

Besides many local varieties of recognised merit, there are at least six improved breeds of swine reared extensively in the British Isles. The White Yorkshire are divided into the three sub-varieties known as the Larghorn, and Suffolk and Berkshire breeds. Then there are the black Berkshire, the Suffolk breed (some black and others white), and the red Tamworth. The black Suffolk pigs are sometimes spoken of as the Small Black breed. The Tamworth is a large-sized pig, rather stronger in the bone than the other sorts, with a long face. It is noted for a high proportion of lean meat. The Large White is the most widely distributed variety. It is being used extensively and with excellent results in the improvement of the pigs in Ireland, Scotland, and on the continent of Europe. The pigs of America are descended mainly from the Berkshire, Poland-China (a breed developed in 1816-38), white Suffolk, Chester, Cheshire, Essex, Jersey red, and Victoria (a breed originating at Saratoga about 1853). The first swine seem to have been introduced into Hayti by Columbus in 1493, and into Florida by De Soto in 1538; within a century pigs bred in Virginia, Canada, and Nova Scotia. The extent of the pork-packing business in America may be estimated from the figures given at Chicago. See also PORK. It used to be said that pigs were indigenous in the Polynesian area, but most likely they were introduced by the earliest navigators. Allowed to run wild, they multiply rapidly under favourable conditions; thus in New Zealand they became at one time a nuisance, and in Nelson province three men killed 23,000 pigs in twenty months.

Pigs are profitably kept wherever there is much vegetable refuse on which to feed them, as by cottagers having gardens, farmers, millers, brewers, &c. They are often allowed to roam over fallow ground, which they graze up for roots, and over stubble-fields, which they glean very thoroughly. It was an ancient practice to allow pigs to feed in woods, where they consumed acorns, beechmast, and the like. When they are fed, as is sometimes the case, chiefly on animal garbage, their flesh is less palatable and less wholesome. The pig has a reputation, which it does not deserve, of peculiar filthiness of habits. It is true that it wallows in the mire, as the other pachydermata also do, to cool itself and to provide itself with a protection against insects, and it searches for food in any puddle; but when it is in a pig-sty, it is kept scrupulously clean. The too common filthiness of pigsties is rather the fault of their owners than of their occupants; and a clean and dry sleeping-place is of great importance to the profitable keeping of pigs.

The Hog Cholera or Swine Plague, due to the presence of a bacterium, caused terrible havoc in the United States in 1870-80, though hardly
known twenty years before. As in the splenic fever of sheep, due also to bacteria, attempts have been made to ward off the more violent form of the disease by inoculating animals with a milder type.

The pig is not inferior to other quadrupeds generally in intelligence, but it excels most of them in obstinacy. It can be easily rendered very tame and familiar. Its acuteness of scent has been turned to account in making it search for truffles; and a tale is told of a pig having been successfully used as a pointer. The pig has sometimes served as an agent of forgery.

The Bush Vark, or Bush Hog of South Africa (Chasœrotamus africanaus), is about 2 feet 6 inches high, covered with long bristles; it has projecting tusks, a large calous protrusion on each cheek, and long, sharp, tufted ears. It is gregarious, subsists chiefly on vegetable food, and makes destructive inroads on cultivated fields. The forests of the island of New Guinea produce a species or variety of pig (S. papuensis) more widely different from the common pig than its breeds are from one another. It is 15 or 20 inches high, with short ears, and very short tail. The Babirussa (q.v.) is another species of pig; see also WART-HOG.

See Columb, Swine Husbandry (New York, 1877); Gilbert, Pigeon-keeping for Amateurs (1882); Long, Book of the Pig (2d ed. 1889).

Pigeon (HtL. piperace, piccione, or pipione, from piper, 'to peep or cheek'), a name sometimes applied, like Dove (q.v.), to all the species of Columbidæ, and sometimes almost restricted to those still included by ornithologists in the genus Columba; having a bill of moderate length, hard, and a little arched at the point, the base of the upper mandible covered with a soft thick skin, in which the nostrils are pierced; the feet with toes divided to the base, and formed both for walking and perching; the wings rather large and pointed; the tail of moderate length, and generally square at the end. The species of this group are very numerous, there being nearly 150 different kinds, and they are found in all parts of the world. Some of them build their nests in trees, and others in rocks. They invariably lay only two eggs at a time, but breed several times in the year, both the male and the female taking part in the process of incubation, and besides feeding in young birds. The origin of all the domesticated varieties of the pigeon is the blue Rock-pigeon (C. livia), the Baiser of the French, a bird of extensive geographical range, being found as far north as the Faroe Islands, and in nearly all parts of the eastern hemisphere. It is found in large numbers on the British coast, particularly on the Orkney Islands and the Hebrides, and also in the Mediterranean. Its food consists partly of molluscs and other small animals, and partly of grain and seeds; and it often pays unreserved visits to the cornfields, raiding with equal state the blue rock-pigeon exhibits great uniformity both of size and plumage; it is not quite 12 inches in length from the tip of the bill to the end of the tail; the prevailing colour is bluish grey, in some parts with green and purple reflections, and having two broad and distinct black bars across the closed wings; the lower part of the back is whitish; the tail is a deep grey with a black bar at the end; the bill is dark brown; the legs and feet reddish orange.

There are also the Stock-dove or Smaller Wood-pigeon (C. cuneata), found all over southern and mid Europe, Asia Minor, and the Russian Empire; the Rock-dove, Wood-pigeon, or Cushat (C. palumbus), very common in all parts of Europe and Asia and in northern Africa, and the largest of the British species. These are all the British species of pigeon. In addition we may mention the Ring-tail Pigeon (C. caribaea), a West Indian species; the Bald-pate or White-headed Pigeon (C. leucocephala), also found in the West Indies and Florida; the Double-crested Pigeon (C. dilophus), found in the northern parts of Australia, and having, as its name indicates, a double crest, one b tł the back part of the head, and the other springing from the forehead. There are other varieties, too numerous for mention.

As already stated, only the blue rock-pigeon has been domesticated, but this species lends itself very readily to the restrictions of civilised life. The changes brought about in it are very varied and remarkable; and the description of his experiments upon the pigeon by Darwin arc of the deepest interest. For many centuries and in all lands pigeon-breeding has been a favourite pursuit with all classes of society. In India several of the native rulers have very extensive establishments for the breeding of pigeons. In Persia and in Asia Minor the pigeon is very largely and carefully bred; and in the latter country especially many of our most beautiful varieties have been produced. From North Africa we have also received at least one fine breed. Throughout Europe this pursuit is followed with a great amount of enthusiasm, more especially in Italy, Germany, France, and Belgium, as well as the United Kingdom. In Belgium the sport of pigeon-flying or racing is the national sport engaged in by all sections of the community; and to that country we owe the variety known as the Homing Pigeon (see CARRIER PIGEON). In the United Kingdom, as in America, there are enormous numbers of breeders who devote themselves to what are known as 'fancy pigeons,' by which term are known those breeds for their special points or characteristics. Of these there is a great and ever-increasing variety, which it is impossible to describe in detail, as there are in all some two hundred breeds, many of which have several distinct colours. The following are some of the most prominent: Carrier (q.v.)—This is not, as is commonly supposed, a member of the homing family, though undoubtedly it was at one time used to carry messages. It is much longer in feather than
PIGEON

PIGMENTS

The blue rock, and is specially characterised by having an abnormal development of the beak and eye wattles, the former of which is like a round 3lesley ball pierced by the beak. Dragon.—Of a similar type, rather lighter in body, and with less height, is the British Magpie, which is better known as a pigeon, but in this ease the eye-wattle is the chief point, and it is bred so that the head has the appearance of a bobbin or reel. These three varieties make up the Wattled Pigeons; and they are all very valuable when bred to perfection. Pouters.—The Pouter is usually a double pigeon, arising from the great development of the crop, which has a globular form, and stands out from the neck. Of these the best known is the English Pouter; and there is also the Norwich Cropper; the former a large bird, and the latter a smaller one. The smallest of this family is the diminutive Dimy Pigeon. In these the head, which is at the back of the crop, is often almost buried by it. Jacobin.—A breed in which the head and neck feathers are largely developed, the former in the shape of a hood, so that the head is often the latter falling on to the shoulders, leaving a round space between, known as the roe. Fantail.—In this the characteristic which gives the variety its name is that the tail-feathers spread themselves out transversely to the body in the resting position, and is even longer in the male. The head is thrown back, often touching the tail, with a nervous motion, the body poised on short legs, and the bird looking as if it were falling backwards. Tumbler.—In these the name is derived from the tumbling or burning motion when flying, so that the head is often curled up in the crop, with the tail flowing out. Pigeons, Frizzled Pigeons, and the Tilpiners.—These include a very large variety, the greater portion of which originated in the Orient. They are thus called because the throat or chest is decorated with a frill of curled feathers, more or less perfect. Some have in addition a crest on the head, and there is an almost endless variety of colour and of markings, the richest—those known as Oriental Frills—being of much later introduction than the Ows and Turbitts. One, the White African Owl, is the smallest of all domestic pigeons, and comes from Tunis. Anteversa. —A very massive-built bird in which there is a considerable admixture of homing blood. Of the other prominent varieties the homer has already been referred to; the Russian Trumpeter has a large crest and very prominent leg-feathering; the Hunt is the largest of all pigeons, and on the table. The system of exhibitions which has grown up of late years has done much to stimulate the breeding of fancy pigeons, and very high prices are paid for the best specimens. On numerous occasions £100 has been given for a single pigeon, and £50 is quite a common price.

For the keeping of pigeons different forms of houses may be adopted. When they are permitted to fly about they may have either small coops for, say, four pairs, mounted on tall poles and then can be made attractive—or they may be accommodated in larger houses. Fancy pigeons are usually restrained by what are called flights or aviaries, which consist of a large space attached to the house, the sides and top made of wire-netting, so that the birds cannot get away. It would be too great a risk to permit valuable birds to fly. Whether in confinement or at liberty each pair of pigeons must be supplied with a nest of their own, which is better kept separate, as often they sit at the same time. In the nest-boxes pans are placed of the usual construction for this purpose. Pigeons are prolific breeders, and will lay several nests during the year, each containing a couple of eggs. Poets, male and female, if permitted to do so, continue faithful to each other from year to year, a circumstance noted by Pliny and others of the ancients.

See DOVEKET, and books on pigeons and pigeon-keeping by Tegetmeier (1866), Piper (1871, Foufion (1876), Brent (1876), Wright (1879), Lucas (1886), Ure (24 ed. 1889), Lyall (1889), and the present writer (1891).

Pigeon-shooting. In the days of the Red House, at Battersea, the members met four times a week in their enclosure on the banks of the Thames for the purpose of pigeon-shooting. The traps mostly in use at that time were what are now known as "T. T. Traps." The latter were large and heavy when men like Lord Huntingfield, Lord Winchelsea, Lord Kennedy, Sir Richard Sutton, Sir Charles Kent, Captain Ross, and Mr George Osbaldeston were present. Captain Ross in 1828 killed at 30 yards rise, from five traps, seventy-six birds out of the other four settled on the fence, and the fourth bird was hard hit, although the shooter's first barrel missed fire. The shooter handled a 12-bore gun by William Moore, charge of powder and shot unlimited. Captain Ross and the Red House Club enjoyed a match at 25 yards, both in 1828 and 1829; and in 1841, in a match at Edinburgh with Lord Macdonald, he at 35 yards killed fifty-two birds out of fifty-three. When the Red House Club was closed in 1850, trap-shooting was for some years out of fashion, until it occurred to Mr Frank Heathcote that a system of handicapping might be advantageously adopted in order to place good and bad shooters on something like an equality. Many successful meetings were now held under Mr Heathcote's management at the Old Horsey Wood House, until the ground was sold. He then established on the Greenheath, and Mr Heathcote in 1867 rented for £700 a year the Lighthouse estate at Fulham (q.v.); and a club being formed, the property was subsequently purchased for £20,000. After the appointment of Captain the Hon. D. J. O., as manager, the club flourished to such an extent that for several years prior to 1891 it had its full complement of 1500 members, under the presidency of the Prince of Wales. As regards the shooting members there are not more than 200, and fully half of these never fire at a pigeon. This can easily be accounted for, as a gentleman can get himself elected almost immediately as a shooting member, whereas in the ordinary ballot for members he might have to wait two or three years. In 1851 over 200 candidates were down for election, and only 15 guineas, with an annual subscription of 5 guineas. The polo ground is the best in the country, and during the height of the London season it is nothing unusual to see three or four thousand of the elite of London society in the park and grounds.


Pigments used in artistic work vary much in permanence. A few of the pictures painted by distinguished artists during the 18th and the first half of the 19th century are already more or less faded by the action of light or otherwise injured by impurities in the atmosphere of rooms. It
impudent to expose any kind of artistic work in colours to direct sunlight or even, it would seem, to the light of electric arc lamps. The following refers to the durability of pigments employed in this way, to which the historian should also be fairly strongly daylight. Among blue colours, ultramarine, both real and artificial, is permanent; while Prussian blue is liable to some change, and indigo is fugitive. Among red colours, vermilion and the red ochres are perfectly durable; while the redder reds and purples can hardly be thrown thoroughly relied upon, and the carmine and crimson lakes, from cochineal, quickly give way. Among the yellows, raw sienna, yellow ochre, as well as the cadmium and Naples yellows, are quite stable; while Indian, chrome, and lemon yellows, and their mixtures, are much liable to change, and as brown, and Caledonian brown do not at all fade; but hardly as much can be said of madder brown, Cologne earth, and Vandyke brown, although these are fairly durable. Asphalum or bitumen has a tendency to move on the canvas unless very carefully applied, and its colour is also altogether permanent. Lampblack, ivory black, and charcoal black are quite durable, so also are flake white, zinc white, and baryta white. It is generally the case that a colour produced by a mixture of permanent pigments is also permanent, and it may be added here that flake white (with lead), so much used to mix with other colours for light tints, is liable to discolor when exposed to sulphurised hydrogen (an occasional impurity in coal-gas), and this colour has also a tendency to tarnish when kept in the dark.

The above remarks on colours made up with oil apply equally to water-colour pigments, with a few exceptions. These are vermilion, especially if artificial, Naples yellow, chrome yellow, and madder brown, the permanency of which cannot be relied upon in Water-colours, under which head some further information may be found.

Fuller information about the pigments named above, as well as others, will be found under the heads Asphalt, Black, Blue, Green Pigments, Lakes, Ochres, Purple Colours, Red Colours, and Yellow Pigments. The oils and varnishes used with these pigments, as well as the nature of the prepared canvas or paper used for painting upon, have all a bearing on the preservation of the colours of a picture. See the Chemistry of Paints and Painting, by A. H. Church (1890).

The history of the introduction of the principal pigments is given at Painting, Vol. VII. p. 702.

Pigments of Animals. That animals are often brightly coloured is evident. Some of the simplest, such as many Radiolarians, are brilliant; sponges are often suffused with pigment; sea-anemones and corals are justly compared to flowers, many marine worms have an iridescent sheen; the Echinoderms are almost always bright; many crustaceans have a jewel-like radiance; myriads of insects are iridescent; the shells of mollusces are rich in beauty; the fishes gleam in silver and gold and many hues; even the amphibian reptiles are multicoloured; certain lizards and snakes seem like flashes of colour; birds are often brilliantly decorated; and mammals have a subdued but often rich colouring in their fur. But all the colours of animals are not due to pigments, for air-spaces in hairs and feathers make these structures white; crystals of guanin or lime often produce a silvery glimmer; striation and other physical peculiarities of the surface cause iridescence.

The most important Pigments. — (a) Pigments called lipochromes are among the commonest, occurring in living bodies, and some of them are exposed to sunlight, although they do not seem to be fairly strong daylight. Among blue colours, ultramarine, both real and artificial, is permanent; while Prussian blue is liable to some change, and indigo is fugitive. Among red colours, vermilion and the red ochres are perfectly durable; while the redder reds and purples can hardly be thrown thoroughly relied upon, and the carmine and crimson lakes, from cochineal, quickly give way. Among the yellows, raw sienna, yellow ochre, as well as the cadmium and Naples yellows, are quite stable; while Indian, chrome, and lemon yellows, and their mixtures, are much liable to change, and as brown, and Caledonian brown do not at all fade; but hardly as much can be said of madder brown, Cologne earth, and Vandyke brown, although these are fairly durable. Asphalum or bitumen has a tendency to move on the canvas unless very carefully applied, and its colour is also altogether permanent. Lampblack, ivory black, and charcoal black are quite durable, so also are flake white, zinc white, and baryta white. It is generally the case that a colour produced by a mixture of permanent pigments is also permanent, and it may be added here that flake white (with lead), so much used to mix with other colours for light tints, is liable to discolor when exposed to sulphurised hydrogen (an occasional impurity in coal-gas), and this colour has also a tendency to tarnish when kept in the dark.

The above remarks on colours made up with oil apply equally to water-colour pigments, with a few exceptions. These are vermilion, especially if artificial, Naples yellow, chrome yellow, and madder brown, the permanency of which cannot be relied upon in Water-colours, under which head some further information may be found.

Fuller information about the pigments named above, as well as others, will be found under the heads Asphalt, Black, Blue, Green Pigments, Lakes, Ochres, Purple Colours, Red Colours, and Yellow Pigments. The oils and varnishes used with these pigments, as well as the nature of the prepared canvas or paper used for painting upon, have all a bearing on the preservation of the colours of a picture. See the Chemistry of Paints and Painting, by A. H. Church (1890).

The history of the introduction of the principal pigments is given at Painting, Vol. VII. p. 702.

Pigments of Animals. That animals are often brightly coloured is evident. Some of the simplest, such as many Radiolarians, are brilliant; sponges are often suffused with pigment; sea-anemones and corals are justly compared to flowers, many marine worms have an iridescent sheen; the Echinoderms are almost always bright; many crustaceans have a jewel-like radiance; myriads of insects are iridescent; the shells of mollusces are rich in beauty; the fishes gleam in silver and gold and many hues; even the amphibian reptiles are multicoloured; certain lizards and snakes seem like flashes of colour; birds are often brilliantly decorated; and mammals have a subdued but often rich colouring in their fur. But all the colours of animals are not due to pigments, for air-spaces in hairs and feathers make these structures white; crystals of guanin or lime often produce a silvery glimmer; striation and other physical peculiarities of the surface cause iridescence.

The most important Pigments. — (a) Pigments called lipochromes are among the commonest, occurring in living bodies, and some of them are exposed to sunlight, although they do not seem to be fairly
Pigments

Poulton that surrounding colours modify those of some caterpillars, and J. T. Cunningham has described the long flat and usually transparent scales on the inner side of the third abdominal segment of insects, which reflect the sunlight in various ways to give bright metallic or iridescent hues.

In many insects and reptiles, the scales reflect and absorb light in such a manner that the body is colored or camouflaged in such a manner as to elude the eyes of the observer. The scales, which are located on the body of these animals, are iridescent and have the ability to change color. The iridescence is due to the structural properties of the scales, which are composed of a protein called pterin. Pterin is a pigment that is responsible for the iridescent coloration of various species of insects and reptiles. The color of the iridescent scales is determined by the thickness and orientation of the scales, as well as the wavelength of the light reflecting off the scales. The scales are typically thin and have a layered structure, with a thin layer of pterin on the inner side of the scale and a thin layer of air on the outer side. The thickness of the scale and the orientation of the layers determine the color that is produced. For example, if the layers are oriented in a way that causes light to interfere constructively, the scale will appear metallic in color. Conversely, if the layers are oriented in a way that causes light to interfere destructively, the scale will appear non-metallic in color.

The iridescence of the scales is due to the constructive and destructive interference of light. Light from a source, such as the sun, is reflected off the scales. The light then passes through the scale and is reflected back to the observer. The light is split into two beams, one traveling through the scale and the other traveling through the air. The two beams travel at different speeds and are therefore out of phase when they reach the outer surface of the scale. This out-of-phase interference results in a loss of intensity, and the scale appears non-metallic in color.

The iridescence of the scales is a complex phenomenon and is influenced by a variety of factors, including the thickness and orientation of the scales, the wavelength of the light, and the angle of incidence. The iridescence is a function of the interference between the light reflected off the scales and the light transmitted through the scales. The interference pattern is determined by the thickness and orientation of the scales, as well as the wavelength of the light.

The iridescence of the scales is a remarkable example of how nature can use simple structures to produce complex and beautiful effects. The iridescent scales of insects and reptiles are a testament to the beauty and complexity of nature.

Pike

Pike (Esox lucius). — The common pike is said to spawn when three years old. The male is usually half as long and half as thick as its mate, but the spawning is protracted. There is great mortality among the young, which take about a week to hatch. Growth is at first rapid, and continues more slowly for years. The longevity of the fish is great, but the records of pike which have attained to 200 years are as unsatisfactory as the evidence for longevity usually is. There is no doubt, however, that they may outlive their keepers; and it is also true that they sometimes venture aashore, and that they sometimes lie in a torpid slumber in the pools. But the most characteristic quality of pikes is voracity. Feeding for the most part on frogs and small fishes, they are often prompted by hunger to bid for higher game, such as ducks, geese, water-hens, and water-rats. Thorne describes the pike as the "swiftest, coarsest, and most ravenous of fishes, which Josselyn calls the river-wolf. It is a solemn, stately, punctual fish, lurking under the shadow of a lily-pad at noon, with still, circumspect, voracious eyes; motionless as a jewel set in water, or moving slowly along to take up its position; darting from time to time at such unholy fish or frog or insect as comes within its range, and swallowing it at a gulp. Sometimes a striped snake, bound for greener meadows across the stream, ends its undulatory progress in the same receptacle." The Bony Pike (Lepidostoma) is a Ganoid, and the name is sometimes applied to the marine Gar-pike (Belone) and to some American perchels. See Bony Pike, Gar-pike.

See the articles ANGLING and PISCICULTURE; Parnell's Book of the Pike (3d ed. 1884); and Bickerdyke's Angling for Pike (1888).

Pike, a word loosely used for almost any kind of lance or Spear (q.v.), whether larger or smaller headed, as used by infantry troops, and now superseeded by the bayonet. The naval boarding-pike is a lance about the length of a man. The short pike, called half-pike or spontoon, long carried by some classes of infantry officers in most European armies, was a kind of Halbert (q.v.) with a smaller but ornamented head, and was rather an emblem of dignity than a fighting weapon. In 1804, when a French invasion was threatened, pikes were distributed by government through the country; and the secret manufacture of iron pike-heads was one of the principal features of domestic industry.
the most disquieting features of the Radical reform agitation in 1819 and during the Chartist troubles.

Pike's Peak, a peak of the Rocky Mountains, in Colorado, 65 miles S. of Denver, by Captain Pike, U.S.A., in 1806. It is situated in 38° 50' N. lat. and 106° 2' W. long., and rises to a height of 14,134 feet, making it one of the highest meteorological stations in the world; while at the base, at Colorado Springs, there is a low-level station. A railway to the top, 9 miles long (41 miles of curves), with a maximum gradient of 1 in 4, has been constructed.

Pilaster, in Classical Architecture, a square pillar, sometimes standing free, but usually attached to a wall, from which it projects 1st, 3rd, or other definite proportion of its breadth. Greek pilasters, or antae, were of the same breadth from top to bottom, and had different capitals and bases from those of the orders with which they were associated. The Romans gave them a taper like the columns, and the same capitals and bases.

Pilate, Pontius, the fifth Roman procurator of Judaea and Samaria, from 26 to 36 A.D. He was personally convinced of the innocence of Jesus, and tried to save him, yet sent him to be crucified to appease the raving mob of Jerusalem, washing his hands before the people to show that he took no responsibility for his death. His rapacity and cruelties caused many outbouts, which were sternly suppressed, and at length culminated in the murder of a number of Samaritans on Mount Gerizim, which caused such loud complaints that Vitellius sent him to Rome to answer to Caesar (36 A.D.). Eusebius tells us that Pilate made away with himself; others say that he was banished to Vienna Allobrogum (Vienne), or beheaded under Nero. In the Eastern Church there is a persistent tradition that he eventually embraced Christianity like his wife, and indeed in the Russian Church Pilate is commemorated as a saint, his day falling on June 25. Pilate is said by Justin Martyr, Tertullian, and Eusebius to have forwarded to Tiberius for his own justification an account of the judgment of Jesus, but the so-called Report, and Acts of Pilate, as well as the two letters of Pilate to Tiberius, have no claim to authenticity.

Many legends have clustered round the sinister figure of Pontius Pilate. One relates how his body was flung into the Tiber, and caused the river to overflow, and how it was next thrown into the Rhone near Vienne, but according to the latest form of the medieval legend) again caused such a storm that it was carried to Mount Pilatus near Lucerne, and there sunk securely in the deep pool on its top. But here again it made storms arise, and every year to this day on Good Friday the devil lifts him out of the pool and sets him on judgment-seat, where he washes his hands now.—Pilate's wife, traditionally called Priscilla or Claudia Priscilla, from her solemn warning to her husband against putting Jesus to death, has been regarded as a Christian by Origen, Chrysostom, and Hilary. In the Greek Church she is a saint, her day falling on October 27. See R. A. Lipsius, Die Pilatus-Arten (Kiel, 1871).

Pilatus, Mount (Lat. Mons Pilatus, 'the hooded pen' from its top being frequently enveloped in cloud; the legends connecting Pilate (q.v.) with the place have presumably grown out of the altered name), an isolated mountain at the western end of the Lake of Lucerne, rising opposite the Rigi. The lower half is clothed with wood and meadow, where in summer over 4000 head of cattle are pastured; the upper portion is a mass of bare and jagged peaks, rising in the Tomlishorn and Pilatus Plateaus. The mountain is one of the highest meteorological stations in the world; while at the base, at Colorado Springs, there is a low-level station. A railway to the top, 9 miles long (41 miles of curves), with a maximum gradient of 1 in 4, has been constructed.

Pilgrim, or Pilaf, a dish common in Turkey, Egypt, Syria, and India, consists generally of rice, thoroughly boiled, drained, and gently stirred with butter, pepper, and finely-chopped onions. For the tables of the wealthy, fowls, lamb, mutton, shreds of ham or bacon, variously cooked, but always much boiled or roasted, are placed on the top of the rice, and served up with it.

Pilchard (Clupea pilchardus, or Almas saradine), an important fish of the family Clupeidae. The pilchard is nearly equal in size to the herring, but rather thicker, and the lines of the back and belly are straighter; the scales are also larger and fewer; and the dorsal fin is rather farther forward. The mouth is small, and in the adult fish destitute of teeth; the under-jaw is longer than the upper.

The upper part of the body is bluish green, the sides and belly silvery white, the cheeks and gill-covers tinged with golden yellow, and marked with radiating strips, the dorsal fin and tail dusky. The pilchard is an inhabitant of more southern seas than the herring. In British seas it is abundant off the coasts of Devon and Cornwall, and the south and south-west coasts of Ireland; towards the east end of the English Channel it becomes scarce, and off the more northern coasts of the British Isles it is only taken occasionally in small numbers. Extending in abundance through the Bay of Biscay, along the west coast of Portugal, and the shores of the Mediterranean; its southern limit is Madeira. In France this fish is known as le sardine. It is true that the sardines in oil imported into Great Britain are smaller than the majority of English pilchards, but they are of the same species. The English pilchard is usually about 10 inches long. The French sardine is said by Moreau to be from 12 to 20 cm. in length—i.e. 5 to 8 inches—sometimes reaching 25 cm. or 10 inches. The fish used for preserving in France are certainly young and not full grown. Pilchards are now prepared in oil in the same way as French sardines, at Mavagissey in Cornwall, and have an extensive sale; so are Sprats (q.v.) at Deal. The fish are captured both by drift-nets and seines; the former method is pursued along the south coast of Devon and Cornwall, while the principal seat of the seine-fishery is Tyne. The drift-net fishing begins in August and continues with fluctuations until the following April, the largest number being landed in November, December, and January. The drift-nets are between 120 yards in length and a fleet consists of twelve to fifteen, fastened together, and extending to nearly a mile. They
PIECOMAYO

are 6 fathoms in depth, and the meshes are usually thirty-six to thirty-eight to the yard. The mesh of the nets used on the French coast is much smaller, not exceeding the hand's breadth. The seine used at St Ives are 160 fathoms long, with a depth of 8 fathoms at the centre, and 6 fathoms at the wings; the meshes are 2⅞ of an inch square. In the seine the fish are not meshed: if they were they would cause the net to sink. There are several stations or fords for fitting the lines of the seine at St Ives, and over two hundred seines. The nets are therefore divided into groups, and each net has to await its turn at the station to which it belongs. The regulations of the fishery are contained in the Sea Fisheries Act, 1868, 31 and 32 Vict. c. 43, sect. 68. The seine-fishery is carried on principally between August and Christmas. Most of the pilchards landed in Devon and Cornwall are salted for the Mediterranean market, especially Italy. They were formerly cured dry, the fish being piled in heaps with salt on a floor, and the brine drained away from them constantly. After remaining thus about a month the fish were sifted from the salt, washed, packed in barrels, and subjected to pressure which forced more oil from them. But at present the salting is carried out in water treading, so that the brine rises over the fish, and they are kept steeped in the liquid for several weeks or months. They are then washed, packed, and pressed as before, the oil being collected and sold principally for the use of leather-dressers. This wet process produces much cleaner and brighter fish than the old one.

Twelve thousand to fifteen thousand hogsheads of these cured pilchards are annually exported to the Mediterranean, each hogshead containing from 2500 to 3000 fish, and weighing 476 lb. gross. A large number of pilchards are also used as bait, especially in long-line fishing, and a good many are eaten fresh locally or in distant markets.

Unlike herrings, the pilchards which are captured are not in breeding condition, but are fat, with small reproductive organs. In fact the habits of the pilchard are the direct converse of those of the herring, pilchards being found feeding near shore, in more or less abundance for nine months of the year, but in June, July, and August, when as a rule none are being caught near shore, spawning pilchards are found at some distance, 10 to 50 miles or more, from land. At this time the females are occasionally taken in mackerel nets, in which the largest ones are meshed in consequence of their swollen condition. The ovum, unlike those of the herring, are quite transparent, and buoyant like those of the cod and mackerel; they pass through their development while suspended separately in the sea-water. Like the herring, the pilchard feeds upon minute crustaceans and other animals, some adult, some larval, which swarm in the sea.

The principal foreign fisheries are at Corunna and other places in the Bay of Biscay, the mouth of the Tagus, and the Bay of Biscay. In New Zealand and many other ports in the Mediterranean. In Scotland the pilchard is known as the Gypsy Herring, Gorrie Herring (the sprat being Gorrie), or Crevia Herring.

Pilcomayo, a river of South America, which takes its rise in two branches in the Bolivian Andes, runs southeasterly, forming a winding course south-east through the Gran Chaco, separating Paraguay and Argentina, and finally joins the Rio Paraguay a little below Asuncion. Its length is said to be 1700 miles, but this is mere guess-work, as no one yet has explored its entire course. Carried on a raft by a boatman's toll, it is a basis on which to estimate the whole. The volume of water brought down is comparatively insignificant, much being spent in lagoons on its way; at the mouth there is scarcely any perceptible current, and the breadth is not 60 yards, while within the first 200 miles it narrows more than once to less than 20 yards, and moreover divides into branches, and some of which explorers, like Captain Page, have lost their way. There have been many attempts, all fruitless, made to open the river route between Argentina and Bolivia: since 1556 a score of expeditions have been sent out, and many of the explorers have perished. Some have obtained 6-fathom soundings for 250 miles from the mouth, but then came rapids, where the river was not more than 2 feet deep; the upper stream, too, is rendered impassable by numerous rapids, and long canals would be required to open the river to navigation. In its upper course its sands are auriferous and the banks fertile; lower down the valley is swampy. The river's water is rendered like brine by the great salt lakes of the Chaco—in which part the river is buried for hundreds of leagues in a great forest of fan-palms.

Piles are usually squared logs of wood used in engineering operations, such as dams, bridges, and roads (see Cofferdam, &c.). They are sharpened at the point, and, if necessary, protected with iron bands, to enable them to cut across the part they encounter as they are driven into the ground. Piles are also used for permanent works, when they are driven through loose soil till they reach a firm bottom, and thus form a foundation on which buildings or piers may be erected. Pile-driving machinery is also used for piles, which are cast hollow. Common piles are driven in by machines called pile-drivers. In these a heavy weight (or monkey) is raised to a considerable height between two guides, and then let fall on the head of the pile. The application of this strain to these drivers has made them very powerful engines—Nasmyth's steam-hammer being a well-known instance. See also Lake-Dwellings.

Piles, or Hemorrhoids, are small tumours situated either within or on the verge of the anus. The first step in their development is the dilatation of one or more veins in this region. They consist of folds of skin or mucous membrane, with the subjacent tissues in an inflamed, infiltrated, or permanently distended condition. Many contain enlarged veins, though these sometimes become obliterated. There are several varieties of these tumours. Sometimes the pile is mainly composed of a little knot of varicose veins; in this case it is readily emptied by pressure of the fluid blood contained in it; it may, however, be cured only when the pressure is removed. Sometimes the blood coagulates, either in a dilated vein, or, if this has given way, around it, forming a solid tumour surrounded by tissues thickened in consequence of inflammation; or the tumour may consist of a kind of erectile tissue formed by an abnormal condition of the vessels of the mucous membrane; this variety is especially liable to bleed. These tumours are divided into bleeding and blind piles, according as they are or are not accompanied with haemorrhage; and into internal and external piles, according as they are within or without the sphincter muscle of the anus.

The following are the general symptoms of this affection. The patient, after having experienced for a varying time a dull pressure in a variable way, and in a varying degree, suddenly becomes conscious of a sensation as if there were a foreign body in the anus, and on examination after an evacuation discovers a small tumour, usually about the size of a grape, which either remains outside or is retracted into the anus, but is often introduced without, or within the sphincter. This tumour gradually increases, and others form around it, until a mass at length results as large as a pigeon's egg, or larger. In its ordinary inoffensive state the tumour

PILES

177
has little sensibility, and occasions comparatively little annoyance; but when it is inflamed (from stranguination by the sphincter muscle, or from any other cause) it is exquisitely tender to the touch, and is the seat of burning and stinging sensations, rendering the evacuation of the bowels (and sometimes also) difficult and painful. In women an inflamed pile may cause pain in the back, irritation of the womb, with mucous discharge, and many other anomalous symptoms. In severe cases the patient can neither stand nor sit with comfort, and only finds relief in the horizontal position. Piles and piles are not only a most important symptom, sometimes the first to be noticed, is hemorrhage, which may be so profuse as to threaten the patient's life.

Piles may be caused by any circumstances which cause congestion in the lower bowel, such as luxurious and sedentary habits of life, pregnancy, and such diseases of the liver as tend to check the return of blood from the veins of the rectum. Moreover, anything that causes irritation of the rectum, such as excessive use of purgatives, dysentery, inflammation of the prostate gland, &c., may cause piles. In all cases, hemorrhage is probably the most frequent; it operates in producing them partly by the pressure of the accumulated and hardened feces upon the veins carrying the blood away from the rectum, and partly by the straining and irritation such feces occasion during the passage of the bowels.

In the treatment of piles it is expedient to relieve the congested state of the lower bowel by one or two doses of sulphate of magnesia, and a cooling vegetable diet, after which the continued use of mild laxatives should be resorted to. A teaspoonful of coffee-water, consisting of a confection of senna, half an ounce of cream of tartar, and half an ounce of sulphur, if taken in the middle of the day, usually acts gently about bedtime, which is far the best time for the bowels of patients of this kind to act, as the parts irritated by the passage of the evacuation become quieter during the night. In long-standing cases, in which there is general relaxation of the mucous membrane, the confection of pepper in doses of a drachm may be given twice daily with advantage, or a scruple of common pitch may be taken at bedtime in the form of pills of gum arabic. A confection of hemlock (Hemlock virginian) are also useful. Amongst the milder forms of local treatment must be mentioned (1) the injection of the rectum with cold water both before and after the motion; (2) washing the anus with yellow soap and water after each evacuation—this should never be omitted by any one who suffers from piles; (3) the application of gall ointment or of other astringents; and (4) the injection of astrigent lotions, as, for instance, of sulphate of iron, in the proportion of a grain to an ounce of water. When the piles are inflamed, balsams to the anus (but not applied directly to the tumours) are sometimes required; but the inflammation generally subsides under the influence of rest in the horizontal position, fomentations, poultices, and low diet. In severe and prolonged cases operations may be necessary between the external piles removal with scissors is usually employed. In certain forms of internal piles the application of castor-oil, especially niter acid, sometimes suffices. Where their removal is required it may be effected either by ligature or by cauterisation.

The treatment of the hemorrhage which frequently accompanies piles requires a few words. If the bleeding is moderate in quantity, and has continued for some time without inducing weakness or any other bad symptom, it is not expedient to interfere with it. When, however, it obviously requires checking, the effect of cold water injected into the rectum, as already recommended, should be tried, and, in case of its failing, astrigent injections should be had recourse to. At the same time the patient should remain in the horizontal position, and take a few of the medicines prescribed for internal hemorrhage, amongst which may be especially mentioned witch-hazel, oil of turpentine, in doses of twenty drops three or four times a day, or ergot of rye in divided doses to the extent of a drachm daily. In rare cases it is necessary to perform a Gonorrhoea, or red-hot wire (through the speculum), or to bring the anus.

Pileus (Lat., ‘a hat’), the upper expanded portion of many fungi (q.v.).

Pilewort. See Ranunculus.

Pilgrim (Ital., pellegrino, Lat. peregrinus, ‘a visitor of foreign lands’). A pilgrim is one who visits, with religious intent, some place reputed to possess especial holiness. The early Christians, like the Jews and the pagan Gentiles, regarded certain places with special religious interest; above all, the Holy Land, and particularly the scenes of the Passion and Resurrection. Our Lord refers the practice of visiting Jerusalem to the discovery of the Holy Cross by St Helen. He himself was a zealous pilgrim; and throughout the 4th, 5th, and 6th centuries pilgrims habitually undertook the long and perilous journey to the Holy Land from almost every part of the world. Other sacred places, too, were held to be fit objects of the same visits of religious veneration. The tombs of the apostles Peter and Paul, and of the martyrs in the catacombs at Rome, are so described by St Jerome. St Basil speaks in the same terms of the tomb of the Forty Martyrs; and the historian Theodoret tells of not only visiting such sanctuaries, but of hanging up therein, as offerings, gold and silver ornaments, and even models of hands, feet, eyes, &c., in commemoration of the cure of diseases supernaturally obtained as the fruit of these pious visits. The Pilgrimage, however, pre-eminent so called, was that of the Holy Land; and, even after Jerusalem had been occupied by the Saracens, the liberty of pilgrimage, on payment of a tax, was formally secured by treaty; and it was from the necessity of protecting pilgrims from outrage that the kings of western Christendom undertook to maintain it. The Crusades may be regarded as a pilgrimage on a great scale; the direct object being to secure for the Latin Christians immunity of pilgrimage. On the other hand, the final abandonment of the Crusades led to a great extension of what may be called domestic pilgrimage, and drew into religious notice and veneration many shrines in Europe, which, after the lapse of time, became celebrated places of pious resort. The chief places of pilgrimage in the West were, in Italy—Rome, Loreto and Assisi; in Spain—Compostella, Guadalupe, Menestir; in France—Fourvière at Lyons (q.v.), St Denis; in Germany—Mariazell, Cologne, Trèves; in Switzerland— Einsiedeln; in England—Walsingham, Canterbury, and many others of minor note; in Scotland—Whithorn, Whithorn (near Dumfries, K. Yorks); Musselburgh, Stowe, Dunedee, Paisley, and Melrose; in Ireland, Lough Derg (q.v.), and many places connected with the life or death of the early Irish saints. The pilgrimage commonly bounded itself only by a temporary vow (differing in this from the vows of the early Christians), terminated at the place of pilgrimage, or at least with the return home, and by which he was bound for the time to chastity and to certain other ascetic observances. The costume consisted of a black or gray girdle, girl with a cincture, from which a shelf and scrip were suspended, a broad hat, ornamented with
scallop-shells, and a long staff. Many abuses arose out of these pilgrimages, the popular notions regarding which may be gathered—although, probably, with a dash of caricature—from Chaucer’s Canterbury Tales, and from Erasmus’s account of the pilgrimage to Walsingham (Peregrinatio religiosis ergo). Pilgrimages have gone much into disuse in France since the Revolution. In later days, however, pilgrims have assembled in large numbers, not only to the ancient sanctuaries of Fourvières, Puy, &c., but also to La Salette, Paray-le-Monial, and since 1858 to Lourdes. There were special pilgrimages by English Catholics to Pontigny (1874), Holy Island (1887), and Lourdes (1888). Knock (q.v.) has become a favourite Calenilar place for the Irish, the English, and the German. In 1874, 15,363 pilgrims were received, and in 1877, 15,110 came. TheDrawing of Knock is by Mr. John Brown (1805) and E. Arber (1897).

**Pilgrimage of Grace**

In their favourite Calenilar place for the Irish, the English, and the German. In 1874, 15,363 pilgrims were received, and in 1877, 15,110 came. The Drawing of Knock is by Mr. John Brown (1805) and E. Arber (1897).

**Pilgrim Fathers**, the first English colony which settled in Massachusetts (q.v.). The company, numbering one hundred men, women, and children, set sail from Plymouth in the Mayflower on 6th September 1620, bound for the banks of the Hudson; but after a long and stormy voyage they landed (21st Dec.) on the bleak shores of Cape Cod, and founded the settlement of Plymouth (q.v.).

See Devereaux’s Pilgrims and the Anglican Church (Boston, 1888); G. F. Holt’s Pilgrims Beyond (Boston, 1888); the History of the Plymouth Plantation, reproduced from the MS.—itself restored to the U.S. in 1897—of William Bradford, the pilgrim who became governor of the colony; and books by John Brown (1805) and E. Arber (1897).

**Pilphhit**

a town in the North-West provinces of India, 50 miles N.E. of Bareilly; pop. 39,799.

**Pillar**, a detached support like a column; but its section may be of any shape, whereas the column is always round. Pillars have been used in all styles of architecture, and their forms and ornaments are usually amongst the most characteristic features of the style. The Greek and Roman pillars (or columns) are the distinguishing elements in the various orders. In Gothic architecture, also, the pillars or piers are of different forms at the various epochs of that style. In the Norman period we have plain massive pillars, square, circular, and octagonal, frequently ornamented with zigzag ornaments, spiral bands, &c., on the surface (fig. 1). As vaulting progressed, the system of breaking the plain surface of the pier, and giving to each portion of the vaulting a separate little column or shaft to support it, was introduced. This was done either by attaching shafts to the pillars, or by cutting nooks in the pillars and setting little shafts in them, thus: a, b, fig. 2. In the Early Pointed style a plain circular or octagonal pillar, with a number of small shafts attached around it, is a favourite arrangement, thus: c, d, fig. 2. In this style the attached shafts are very frequently banded to the main pillar at different heights, and they are sometimes made of a finer material, such as Purbeck marble. In the Decorated style the pillar is of a lozenge form, and not so much ornamented with detached shafts as with pilasters; plain, circular, or octagonal pillars, however, are used in this, as in all the styles. The mouldings and shafts are usually filleted; and some of the mouldings run up into the arch without any cap. In Perpendicular the same idea is further carried out; the mouldings become thinner, and are more frequently run up into the arch without caps. See Flamboyant.

**Pillar-saints**, an English rendering of the Greek stylites, the name of a class of hermit-ascetics, chiefly Syrian, who crucified the flesh by living on the summit of pillars in the open air. The most noted was Simeon called Styliiates (q.v.).
PILLAU

Pillau, a Prussian town and fortress of the third rank on a spit of land at the entrance of the Frisches Haff, 30 miles W. of Königsberg by rail. Pop. 5454.

Pillitz, the ordinary summer residence of the royal family of Saxony, in a beautiful situation on the Elbe, 5 miles S. of Dresden. The palace embraces detached buildings or 'castles,' and is surrounded with beautiful parks and gardens. Here, in August 1791, the Declaration of Pillitz was framed, according to which Austria and Prussia agreed to take common action on behalf of the royal family of France against the Revolutionary

Pillory, an engine for the public punishment of criminals, disseased in Britain since 1837, but previous to that time commonly employed, as it also was in France and Germany. It consisted of a stout plank fixed like a signboard on the top of a pole, the pole being supported on a wooden platform elevated above the ground. Above, and parallel to this plank, another of like dimensions was placed in a similar position with respect to the pole, and fixed to the former by a hinge, being thus capable of being moved upwards from it, or closed upon it, when necessary. A large circular hole was made in the middle of each of the two planks, and two corresponding holes of smaller size were formed, one on each side of it; the large hole was for receiving the neck, and the two smaller the wrists. When a criminal was to be placed in the pillory he was made to mount and stand upon the platform; the upper part of the two sign planks was raised to allow the culprit's neck and wrists to be inserted in their proper grooves, and then brought down into its place, and fastened by a padlock, or in some other way. The pillory seems to have existed in England before the Conquest, in the form of the stretch-neck (an instrument by which the neck only was confined), and was originally intended, according to the 'Statute of the Pillory' (51 Hen. III. chap. 6), for persons guilty of forestalling and regrating, using deceitful weights and measures, perjury, &c. Its variety and colloquiality led to this class of offenders till 1632, when restrictions were put upon the press, and all who printed books without a license were put in the pillory. From this time it became the favourite mode of punishing libellers against the government, and many eminent men were made to wear it, among them Leighton, Liburn and Warton the printers, Pryme, Dr Lastwick, and Daniel Defoe. These sufferers were popular favourites, and the encouragement, applause, and sympathy of the crowd around converted the intended punishment into a triumph; but such men as Titus Oates, and the class of offenders including perjurers, swindlers, polygamists, &c., who were objects of popular hatred and disgust, were pelted with rotten eggs, garbage, mud, sometimes even with more dangerous missiles. In 1757 the preacher Thomas Evans was pilloried for singing a seditions Welsh song; so too, in May 1812 was Eaton, the publisher of Paine's Age of Reason; and in 1814 the celebrated naval hero Lord Cochrane, afterwards Earl of Dundonald, was sentenced to stand an hour in the pillory, but in the latter case the government did not dare to execute the sentence. The punishment was abolished for all offenses save perjury in 1815; and the perjurer Peter James Rosey was the last to stand in the London pillory, in the Old Bailey, for one hour, on 224 June 1830. In France the pillory was long ago called 'carrée' (a word of unknown origin), and in recent times carrée, from the iron collar by which the criminal's neck was attached to the post; and even so late as 1840 a woman who had poisoned her husband was at least sentenced to the pillory at Tulle as part of her punishment.

See Douce's Illustrations of Shakespeare, Griffith's Chronicles of Newgate, Andrews' Punishments in the Olden Times, and Jewitt in the Reliquary for April 1861. See also JOUGS, CANE, STOCKS, and STOOL OF REPEREANCE.

Pills are the most generally convenient and popular of all forms of medicine. They are formed from mixtures of the most convenient shape, and yet not so hard as to be of too difficult solution in the stomach and intestines. This form is especially suitable for (1) all remedies which operate in small doses, as metallic salts; (2) those which are designed to act slowly and gradually, as certain alteratives; (3) those which are too readily soluble when exhibited in other forms; (4) substances whose operation it is desirable to retard until they have reached the lower intestines, as in certain pills for habitual constiveness; (5) bodies whose specific gravities are too inconsiderable to allow their suspension in aqueous vehicles; and (6) solid substances: while it is unsuitable for (1) medicines which require to be given in large doses; (2) dysequivalent salts; (3) fluid or semi-fluid substances, such as oils, balsams, &c., which require a very large proportion of vehicle to make them sufficiently tenacious to form into a mass; (4) substances so insoluble that when exhibited in solid form they pass through the intestinal canal unaltered, as extract of logwood. Many substances, such as vegetable extracts, may be at once formed into pills without any addition; but most substances require the addition of a material termed an excipient for converting it into a pill-mass. The excipients in most common use are bread crumbs, hard soap, extract of liquorice, mucilage, syrup, treacle, honey, castor-oil, and conserve of roses. From the property of preserving pills for a long time in a properly soft state the most valuable excipient is the conserve of red roses; and, perhaps, next to it treacle is the most valuable excipient, as it does not undergo any change by time, but maintains its proper consistence, and preserves the properties of the ingredients of the pill. It is common to place pills in some fine powder to prevent them from sticking to each other, and to conceal their taste. For this purpose liquorice powder, wheat-flour, starch, and magnesia are generally used in Britain, and lecypodium or the aloe, which are continually in use, and activity far longer in small bottles than in the ordinary pasteboard boxes. The ordinary weight of a pill is five grains; if it much exceeds that weight it is too bulky to swallow conveniently if consisting of vegetable matter. It is very common to meet with patients who express their inability to take this form of medicine. If, however, they practise with a small globular mass towards which they feel no repugnance, as a pellet of bread or a currant, placing it on the back of the tongue and gulping it down with water, they will soon get over their objection.

To many people the taste of pills is a great deterrent, and various methods of coating the pills are resorted to for their benefit. Formerly coating with gold or silver leaf or with a little boul resin dissolved in chloroform were the only methods, but more recently the gelatin tablets, and pearled tablets have been prepared in vast quantities and have become very popular. There is, however, always a risk of the deterioration of such pills, owing to the length of time which they may be kept before being sold. See also QUACK DOCTORS.

Pilocarpine. See JABORANDI.
Pilot is a person specially deputed to take charge of a ship while passing through a particular sea, reach, or dangerous channel, or from or into a port. Pilots are of three classes—(1) those licensed to act in districts where the pilotage is compulsory; (2) those licensed to act where the pilotage is not compulsory; (3) unlicensed pilots. British pilots are licensed by the Trinity Houses of London, Hull, Newcastle-on-Tyne, and Leith, and by Pilotage Commissioners in other ports. The British pilotage laws were consolidated by 6 Geo. IV. chap. 125 and in 1853, but extensive changes were made by the Merchant Shipping Act of 1855, part v., and minor changes in 1862, 1872, 1874, and 1889. By the last of these acts the monopoly of employment claimed by licensed pilots has been strengthened. The scale of pilotage fees paid by the ship depends upon the distance piloted and the ship's draught of water. The fees earned are sometimes retained by the pilot earning them, less deductions for collection, superannuation, sick, or widows' funds, and sometimes they are thrown into a joint stock.

In the United States the several states make their own pilotage laws, which generally provide for the appointment of commissioners with power to make all needful rules and regulations.

A British pilot must have the conspicuously painted upon it his number, owner's name, and the port to which it belongs, and must show a large flag of two horizontal stripes, the upper white and the lower red. At night a pilot-boat on its station shows a white light, and in addition shows a flare at intervals not exceeding fifteen minutes. Shipmasters or mates are often licensed to act as pilots for their own vessels.

By British law no owner or master of any ship is answerable to any person whatever for any loss or damage occasioned by the fault of any qualified—i.e., licensed—pilot acting in charge of such ship, within any district where the employment of such pilot is compulsory by law, but this law is not international nor universal. In general, foreign nations are more stringent than Britain in excluding aliens from their pilotage services for military reasons.

Pilot-fish (Neurates duetera), a well-known fish which accompanies sharks and follows ships. It usually keeps to the open sea, and is very widely distributed in tropical and temperate regions. From the Mediterranean it sometimes follows ships to British coasts. In length it is about a foot, in shape like a mackerel, in colour variable, though generally graysish blue with five transverse dark blue bands. The first dorsal fin is represented by a few spines. Its zoological position is beside the horse-mackerels in the family Carangidae.

Many wonderful stories are told about the pilot-fish, which seems to be the Pampus of the ancients. It is said to guide the shark to its prey—nay, more, to show sailors their desired course. It certainly is a very frequent companion of the shark, especially if that fish be swimming alone, but the precise nature of the association is doubtful. The pilot-fish probably follows the shark as it follows a ship for the sake of scraps of food, and perhaps the parasitic crab, &c. With which the skin of the shark is often infested. Moreover, companionship with the shark probably protects the pilot-fish from its enemies.

Pilots. Karl von, head of the new Munich school of painters, was born in that city on 1st October 1826, studied at its academy, and sat at the feet of Schmor and Sehorn and the modern French and Belgians masters. In 1865 he was appointed professor of Painting at the Munich Academy, and in 1874 succeeded Kaulbach as director of the same. He died in his native city on 21st July 1886. All his best pictures belong to the class of historical genre; several of them are the prototypes of art built by the Bavarian kings at their capital, as the Maximilians and the New Pinakothek. Piloty was a pronounced realist; he strove to reproduce nature exactly, even to the minutest details, but did not steer clear of the dangers that attend the effort to carry out the most rigid principles to their most rigorous conclusions. He distorts the relative importance of essentials and subordinate details, and, in spite of his skill as a portraitist, his pictures frequently have a theatrical air. His drawing was strictly objective; he showed the more freedom in the choice of subject and in the employment of colour. Most of his pictures have melancholy subjects and a pathetic effect or sad background; amongst the best of them may be quoted 'Semi beside the Body of Wallenstein,' 'Nero amid the Flames of Rome,' 'Wallenstein's March upon Eger,' 'Galilei in Prison,' 'Columbus,' 'Death of Caesar,' 'Announcement of the Sentence of Death to Mary Stuart,' 'Thusnelda in the Triumph of Germanics,' and 'Death of Alexander the Great.' Piloty was an excellent teacher, his principal endeavour being to develop the individual genius of his pupils, amongst whom were Makart, Defregger, Lenbach, Max, Dietz, and others. See the Art Journal for 1865; Mrs Howitt-Watts' Art-student in Munich (2d ed. 1879); and Rosenberg, Die Münchner Maler schule (1887).

Pilpay. See Bipal.

Pilsen, the second town of Bohemia, situated in a fertile and beautiful valley, 67 miles by rail SW. of Prague. There are numerous active industries, producing building materials, machinery, metal-work, porcelain, spirits, liqueur, leather, &c. In the neighbourhood are mines of iron, alum, vitriol, coal, and sulphuric acid. But the town is most widely known from giving its name to the most approved kind of Bohemian beer, which is brewed to the extent of 9 million gallons a year, and (whether made there or elsewhere) is now largely imported into Britain. The town was stormed by Ziska in the Hussite war and by Count Malsfeld in the Thirty Years' War (1618); it was Wallenstein's headquarters in 1633-34. Pop. (1880) 38,883; (1890) 50,093.

Pimento, also called Allspice or Jamaica Pepper, a well-known spice, the dried fruit of Eugenia Pimento, a small West Indian tree chiefly confined to St. Vincent, which grows to the height of 20 or 30 feet, and has oblong or oval leaves about 4 inches long, of a deep shining green, and numerous axillary and terminal trichotomous panicles of white flowers, followed by small dark purple berries. The pimento-tree is cultivated in some of the West Indian islands. It is a very beautiful tree, with straight white trunk and much-branching head; about the month of April it is covered with an exuberance of flowers, which diffuse a rich aromatic odour. The leaves
and bark partake of the aromatic property for which the fruit is valued. The fruit, when ripe, is filled with a sweet pulp, and the aromatic property which so strongly characterises it in an unripe state has in a great measure disappeared. The gathering of the berries, therefore, takes place as soon as they are full size, when the blossoms are shed and the parch of peppers are gathered by the hand, and dried in the sun on terraced floors, during which process great care is taken, by turning and winnowing, to prevent them from being injured by moisture. Their colour changes in drying from green to red. Bushel boxes of dried pimento are packed in bags for the market. Some planters kiln-dry them. The name Allspice was given to pimento from a supposed resemblance in flavour to a mixture of cinnamon, nutmeg, and cloves.

Pimento is much employed in cookery, and is also used in medicine as a carminative and stimulant to prevent the griping of purgatives, and to disguise the taste of nauseous drugs. It depends for its properties chiefly on a volatile oil, Oil of Pimento, which is obtained from it by distillation with water, and is sometimes used to relieve toothache. The leaves, stems, and berries, when carried on in young shoots of the tree. From 3000 to 4000 bundles (500 to 500 in each bundle) are shipped annually from Jamaica for sticks for umbrellas. The crop of pimento in Jamaica, which alone furnishes the spice to commerce, varies. In 1888 it was 60,550 cwt, and in 1889, 46,179 cwt. The average receipts of the spice in England are about 4,000,000 lb.

Pimpernel (Anagallis), a genus of elegant little annual and perennial plants of the natural order Primulaceae, natives chiefly of temperate climates. They have a wheel-shaped corolla, and the capsule is divided into five, as in the midday, or mimicry. The flowers are not large, but very beautiful. Those of the Scarlet Pimpernel (A. arvensis), common in most parts of Europe and many parts of Asia, and occurring in Britain as weeds in the fields and gardens, are of a fine scarlet colour, with a purple circle at the eye. They usually open about eight in the morning and close about noon. In the common belief, mentioned by Lord Bacon, their opening in the morning presages a fine day; while they certainly close very readily upon the approach of rain—whence the popular names in some places of Poor Man's Weather-glass and Shepherds's Barometer. The Blue Pimpernel (A. caerulea) is far less common in Britain, but very abundant in some parts of Europe. The Bog Pimpernel (A. tenella), frequent in bags in England, but rare in Scotland, is an exquisitely beautiful plant. Several species are cultivated in flower-gardens. Acid properties prevail in this genus, and A. arvensis has been used medicinally in epilepsy, dropsy, and mania. The name Water Pimpernel is given to Samolus valerandi, also called Brookweed, another British plant of the same order, with racemes of small white flowers, growing in wady or gravelly places. It is supposed to be the Samolus which Phiny says the Druids gathered fasting, with the left hand, and without looking at it, ascribing to it magical virtues in the cure and prevention of diseases in cattle. Its geographical distribution extends over Europe and Asia.

Pinar del Rio, a city of Cuba, 95 miles direct W.S.W. of Havana, with which it is connected by rail, and about 14 miles from Colonna, its port, on the south coast. It is the centre of the famous 'Vuelta Abajo' tobacco region, and trades in tobacco. Pop. (1899) 8880; of the province, 173,934.

Pimples. See PAPULES, ACNE, PUSTULES.

Pin. See PINS.

Pina Cloth, a beautiful fabric made of the fibres of the leaves of the pine-apple plant. See FIBROUS SUBSTANCES, BROWELLACE.

Pincbeck, a reddish-yellow alloy of zinc and copper, containing 4 parts of copper to 1 of zinc. It was invented by Christopher Pincbeck, a London clockmaker, who died in 1732, and was much employed at the beginning of the 19th century for making watch-cases and other small articles in imitation of gold. The term is now but little used.

Pindar, Charles Cotesworth, an American statesman, was born at Charleston, South Carolina, 25th February 1746, was sent to England and educated at Westminster and at Christ Church, Oxford, read law at the Middle Temple, and studied for a while at the military academy in Caen. He afterwards sailed as a barrack reader at Charleston. He was Washington's aide-de-camp at the battles of Brandywine and Germantown, and afterwards, as colonel, saw much active service, until 1780, when he was taken prisoner at the surrender of Charleston, and detained till called for in the peace of 1783. A member of the convention that framed the constitution of the United States (1787), he introduced the clause forbidding religious tests as a qualification for office. He declined the secretaryship of war in 1784, and of state in 1785; in 1790 he was sent as minister to France, but the Directory refused to receive him, and he returned to quit the country. It was while on this mission that, when it was intimated that peace might be granted in return for a money payment, he replied, 'Millions for defence, but not a cent for tribute.' He was unsuccessful in 1800 as Federalist candidate for the vice-presidency, and in 1804-8 for the presidency. He died 16th August 1825.

Pindar (Gr. Pindaros), the chief lyric poet of Greece, was born about 522 B.C., of Thesan family at Cynocephalides, near Thebes, the capital of Boeotia, a district in which music and poetry were widely cultivated. His family, the Ageidei, was an old and illustrious one, often mentioned in the heroic legends. His father or his uncle was a flute-player, and Pindar inherited the musical talent of his family. He made music and poetry his profession, and was placed under the tuition of Lasus, a well-known musician and poet, at Athens. Thothes was the bitter foe of that city, Pindar often speaks of Athens with love and admiration, but he is to have been influenced far more deeply by Corinna and Myrtis, two poetesses then famous, with whom he competed for the prize at public contests. Corinna five times gained the victory over him. She assisted the young poet with her advice, judiciously as it would seem. It is said that she urged him to introduce mythical subjects into his poems, and then, when he had composed an ode introducing almost the whole Thelian mythology in the first six verses, she smiled and said: 'We ought to saw with the hand, and not with the whole sack.' He recommenced his career of composition for special occasions at the early age of twenty with a song of victory which still remains (Pyth. X., composed in 502). He soon reached the highest rank in his profession, and composed odes for persons in all parts of the Greek world. He was employed by his kinsman, the Sicilian ruler, Hiero II., and Thero of Agrigentum, by Arseleus of Cyrene and Amyntus of Macedon, as well as by the free cities of Greece. Wherever he went, he was honoured and loved for his own sake as well as for his art. State dinner with one another in doing him honour, and the cities like Athens and Piraeus made him their public guest. Though a frequenter of princely houses and king's palaces, he never lost his independence. In his poems he gives advice and reproof as well as praise to his patrons. He warns
the great Hierof to avoid flatterers, and cantions Areoslaus of Cyrene against undue severity. He resided four years at the court of Hiero. He died about the age of eighty in 443 B.C. Two conquerors—Panamis, king of Sparta during the Peloponnesian war, and later Alexander the Great, who held the court of Hiero, stood together in Thebes standing—spared the house of Pindar.

Pindar was in the prime of life when Salamis and Thermopylae were fought, when Greek energy and enterprise were at their highest, and Greek poetry and philosophy were opening into their rich field. This was to his people not an old rather than the new period of literature. In spite of his admiration for Athens, which he calls 'the pillar of Greece,' the spirit of Athens did not lay hold of him. Intellectually, he stands nearer to the age of Homer than to that of his contemporary Eschylus. Pindar's language is Epic, tinged with Doric. He wrote an immense number of poems, including hymns to the gods, pears, dithyrambs, odes for processions (prosodia), mimic dancing songs (hyperoochenaia), chorical songs of maidens (parthenoeis), convivial songs (sakoi), dirges of fallen heroes, and odes in praise of the victors (encomiai). Of all these poems we possess fragments only, often very beautiful, but his Epinikia or Triumphal Odes have come down to us entire. They are divided into four books, celebrating the victory of the Olympic, Pythian, Nemean, and Isthmian games. The special occasion for which these odes were composed explains their character. A victory won either in the chariot-race, for prowess in wrestling or other exercises, or for skill in music was the subject of another song, to which he also added a victory to the winner and his family, but also on his city, and received a solemn celebration. It began with a procession to the temple, where sacrifice was offered, followed by a banquet, and concluding with a boisterous revel (zomia). Thus the festival was partly religious, partly convivial and jocose. For the occasion an ode was composed, and was sung by a chorus either during the procession or, more frequently, at the banquet. An intense enthusiasm for athletic sports was one of the most distinctive features of Greece, and, as of the Greek national character. The performance of a triumphal ode by a trained choir to the music of lyre and flute, amid an enthusiastic concourse of the victor's townsman, must have been one of the most stirring events of Greek civic life. Pindar not as a mere poet of athletic triumphs, but as connected with the victor's whole life and history. He loves to dwell on the moral side of it, not merely on the bodily prowess which gained it, but on the temperament, love to parents, or piety which secured the favour of the gods who granted success. And this is to him no mere poetic fiction, for he has the sincerest faith in the divine superintendence. But it is too much to say, as Paley does (Trans. Pref. p. viii.), that Pindar shows 'unquestioning creulity in the wildest legends.' Of myths relating things unworthy of the gods he says he cannot understand 'such visions of the divine beings!' (as of the myth of Pelops, Od. i., and another regarding Herakles, Od. ix.). The plan of his poetry is intricate, and the connection of the different parts is often very hard to see. Pindar is deeply skilled in trains of thought, either relating to the victor, his ancestors, the history of his city, or else moral reflection; he breaks off each of these before the application is seen, and it is not till the end of the poem that he weaves the different threads together and explains the allusions. Thus, says Miller, 'the curiosity of the reader is kept on the stretch throughout the entire ode.' The great merit of Pindar's poetry is its vivdness and picturesque power, seen even in single epithets, as when he calls the mountain-mass of Etna, overtopping all heights in the island, 'the forehead of fertile Siciy.' It is this vigour and vividness which suggest Mrs Browning's picture of 'bold, electric Pindar . . . with race-dust on his cheeks,' and urges that some of his odes should be sung as his last goal. The description of the happy lot of the good after the final judgment in the Islands of the Blessed (Od. ii.), the voyage of the Argonauts (Pyth. iv.), and the vivid picture of the eruption of Etna in the First Pythian Illustrate this power. He had a special gift for making his odes speak as in a mirror the intense admiration of the Greeks for bodily prowess, strength, endurance, and beauty. Such gifts rouse in him a feeling of religious veneration; they come from the gods and are sacred. The groundwork of Pindar's poems consists in those legends well known from the Greek religious literature. It will be seen that his life was intimately associated with the observances of Greek religion. In connection with the worship at Delphi he received unique honours. The belief in his divine inspiration existed from the first itself in the legend, which apparently sprang up during his life, that the god Pan was seen and heard in a glade between Citharodon and Helicon singing one of Pindar's hymns. When once asked what sacrifice he intended to offer at Delphi, he answered 'poetry,' and the following hymns are full of religious feeling, not formal but real. His protest against myths dishonouring to the gods shows a truly reverent nature and an enlightened belief. Both in its strength and in its deficiences his poetry reminds us of his claim on his own behalf: 'The name was wise when Homer made by natural genius;' but the poets, his rivals, 'those who have learned,' the versatile talkers, are not as rows calmly chattering against the divine bird of Zens.' Thus the distinction between genius and talent is as old as Pindar's time. This high faith in his own poetic inspiration must be the stronger for self-confidence; it also almost verges on a contempt for art which seems responsible for the frequent intricacy and obscurity of his poetry.

See Höckel (1811-21); Dassen (1830); re-edited by Schneidewin, 1851-5; see also Schneidewin's letter (1853) to the editor of Schneidewin's death (complete); Fellner (1879-83); Bury, Nemean Odes, 1891; translations by Cary in verse (1838), Paley (occasionally powerful, but arbitrary; (1850)), E. Myers (2d ed., 1883). (Muller and Dodin's History of Greek Literature is full of excellent criticism.

Pindar. See WOLCOT.

Pindar’s, or Pindarees, bands of freebooters or mercenary soldiers who, after the overthrow of the Mogul empire of India, grew (1804-17) to be a formidable power in the Central Provinces, their headquarters being at Malwa. Hastings put an end to their depredations, gathered two armies (120,000 men in all) in 1817 and crushed them.

Pind Dadan Khan, a town in the Punjab, stands one mile N. of the Jelum and 110 miles NW. of Lahore. The people (16,724) make brass and copper utensils, pottery, whips, boats, and woolens, and carry on a large trade.


Pine (Pine), a genus of trees of the natural order Coniferales. Pines are distinguished by monocious flowers, and woody cones with numerous two-seeded scales, the scales having an angular truncated apex. The leaves are linear and very narrow, growing in clusters or in pairs, and surrounded by scale-like glands at the base. To this genus belong many noble and useful trees. They mostly grow in mountainous or other exposed situations, and their narrow leaves are admirably

PINE
adapted to evade the force of winds, which produce in the tops of pines a peculiar sound, much noticed by the ancient poets, more soft and continuous than in trees of richer foliage. Most of the pines are more or less social, one kind often covering a considerable tract; some of them clothing the sides and even the summits of mountains with magnificent but sombre forests; some growing in lower situations, on otherwise unproductive sandy grounds, as the Pine Barrens of North America. The pines growing in the most barren soils, or in the coldest climates and most exposed situations, are often very small, and, although very unlike any other shrubs or bushes, are scarcely to be called trees. Pines are widely diffused over the northern hemisphere, being found on mountains within and near the tropics, and in the colder temperate and the arctic regions descending to the level of the sea.

The Scotch Pine, commonly but erroneously known as the Scotch Fir (P. sylvestris), is the only species indigenous to Britain. It has leaves in pairs, about an inch and a half long, the cones about the same length, oblong, and with unarmed scales. On very poor soils and at great elevations it is reduced to a kind of shrub, but in favourable situations it becomes a lofty tree. A plank five feet and a half in diameter has been obtained from a Scottish forest. The Scotch pine is of quick growth, but has been known to attain the age of 400 years. Its head is somewhat conical or rounded, and the lower branches die off as the tree grows, leaving the older trees bare of branches for the greater part of their height; but it is more apt to send off large branches than most of the Conifers. There are still native forests of Scotch pine at Braemar and elsewhere in the Highlands of Scotland; and even in the south of Scotland noble trees are to be seen which, probably, were not planted by man. The Scotch pine is not indigenous to the south of England, but, having been introduced, is spreading rapidly and spontaneously, along with the Pinaster, in some of the heaths and other unfertile tracts. Immense forests of it exist in some countries of Europe, in some of which it is mingled with the Spruce Fir. In the middle and north of Europe and of Asia it is found even in plains near the level of the sea, especially where the soil is somewhat sandy; in the south of Europe it grows only on mountains. Its timber is highly valuable, being very resinous and durable, and is the Red Deal or Red Pine used in house and ship carpentry. There is very great difference, however, in the timber of Scotch pine growing in different soils and situations, rich soils and sheltered situations being unfavourable to the quality of the timber, which becomes white, soft, and comparatively worthless; and there exist several varieties of Scotch pine, some of which yield timber very superior to others. Many plantations in Britain have, unfortunately, been made of inferior kinds. One of the best varieties is that which forms the northern Scottish forests, often designated Braemar Pine by nurserymen. It is remarkable for its very horizontal branches, and is therefore sometimes called P. horizontalis. The Scotch pine is not only valuable for its timber, which is available for some purpose at every stage of its growth, but on account of other products. Common Turpentine is obtained from it, and much Tar, Pitch, Resin, and Lamplack (see these heads). Oil of turpentine is sometimes distilled from the cones, and even from the leaves; the leaves have also been used for the manufacture of Pine-wood (see FABRIOUS SUBSTANCES, Vol. IV, p. 606). The resinous roots are dug out of the ground in many parts of the Highlands of Scotland, and, being divided into small splinters, are used to give light in cottages instead of candles. Fishermen, in some places, make ropes of the inner bark, which is applied to a very different use, when most soft and succulent in spring, by the Kamchatkans and Laplanders, being dried, ground, steeped in water to remove the resinous taste, and used for making a coarse kind of bread.

The Dwarf Pine (P. Pumilio) is found on the Alps and Pyrenees, its trunk often lying on the ground, although sometimes it appears as a bush or low tree. The leaves are in pairs, very like those of the Scotch pine, but a little longer; the cones

---

**Fig. 1.** Scotch Pine (*Pinus sylvestris*):

a, young shoot with female flower; b, twig with male flower; c, female flower; d, ripe cone; e, the same, opened; f, pair of needles with section.

**Fig. 2.** Cones of (a) *Pinus montana*; (b) *P. pinea*; and (c) *P. Pinaster*. Cones and needles of (d) *P. crassilata*; and (e) *P. Lambertiana*. All about 1 natural size.

...are also similar. From the young shoots an oil resembling oil of turpentine is obtained by distillation, which is a kind of universal medicine among the peasantry of Hungary, as is also the resin spontaneously exuding from the tree, which is known as Hungarian Balsam. The Black or Austrian Pine, or Black Fir (*P. nigra*), or *P. austriaca*,
another species closely allied to the Scotch pine, but remarkable for its very long leaves. It is a native of Austria. It abounds in resin more than any other European tree. To the same group of pines belongs the Seaside or Taurian Pine (P. /alliata, maritima, or tarriaca), which also abounds in resin; and the Scotch, or Canadian, is a very handsome and pleasant odour. It is found in many parts of the south of Europe. Its timber is of little value; but great part of the turpentine of the Landes and other maritime districts of France is obtained from it. It yields also part of the Eucalyptus Pitch of the southern States, the tree called Juniper, (Juniperus halepensis), a native of the south of Europe, Syria, &c., is a very graceful tree of moderate size, with leaves in pairs and slender. It yields a liquid resin or turpentine, which is extracted from it in Providence and elsewhere, and sold as Venetian Turpentine. The wood is extensively used in the Levant for shipbuilding. The Laricio (P. Laricio) has leaves in pairs, lax, and 4 to 8 inches long, cones 2 to 4 inches long, with the scales slightly pointed. It is often called the Corsican Pine. It grows in the plains of that region, and is valuable both for its timber and for its resinous products. In the island of Corsica it frequently attains the height of 140 feet. It grows well in sandy soils, and has been made particularly useful for preventing the drifting of the sand, and turning to timber the unproductive portions of the shore. The months of the Garonne and the Adour in France, thus also preserving valuable lands which the sand threatened to overwhelm. The Pinaster or Cluster Pine (P. Pinaster) is another of the most important European species. It has cones in whorls of 3, 4, or 5, in length 4 to 6 inches long, with the scales rounded, in pairs, and very long. It is found on the shores of the Mediterranean, and also in the Himalayas and in China. It has been used in France to a great extent, in the same way as the Laricio, for covering waste sandy tracts. The timber is of inferior quality, but great quantities of resin are procured from it. It yields Bordeaux Turpentine. The Pyrenean Pine (P. pyrenaicus) is a majestic tree, a native of the Pyrenees, and producing very fine timber. The Calabrian Pine (P. brutia) somewhat resembles the Pinaster. The Turkish Pine (P. pinea), a tree with a broad umbrella-shaped crown, and a form often seen also in the Scotch fir, forms a characteristic feature of the scenery of the Mediterranean. It is the Pinie of the Germans, the Pignau of the French. The leaves are in pairs, 4 to 5 inches long, the cones very large, ovate, and obtuse. The seeds, which do not ripen till the fourth year, are large, abound in a fixed oil, and when fresh, have a sweet taste resembling that of almonds. They are used in Italy and other countries in the same way as almonds and pistachio nuts for the dessert, in various dishes, also in emulsions, &c., under the names of pinias, pinioles, and pignons. The use of them, however, is almost entirely confined to the countries in which they are produced, as they very soon become rancid. They are sometimes imported into London in the cabin in long vessels, 6 to 8 inches long, but here the cost of importation is much increased. The wood of this tree is very useful and beautiful. It yields resinous products only in small quantity. The Cembra Pine, or Swiss Stone Pine, with its cones in the central parts of Europe and the south of Siberia—a stately tree, with the lower branches more persistent than they are in most pines, and rigid leaves in groups of three to five— also produces edible seeds (Cembra Nuts). The Cembra Pine yields a pellicent, whitish oil, resembling that of turpentine, and known as Carpathian Balsam.

North America produces many species of pine, some of them very beautiful and very valuable. Besides those long known, and which are found in the states and colonies near the Atlantic, a number of the noblest species of this genus have, since the commencement of the 19th century, been discovered in California and the north-western parts of the United States. The Weymouth Pine, discovered in the autumn of 1850, is found from Canada to the Pacific, but does not reach far south in the United States. It is the Yellow Pine of California and Nova Scotia. It delights in dry and sandy soils, and attains a height of 80 to 90 feet, with a diameter of 2 feet at the base, the tree is stately, and is thinned for two or three of its length. The leaves are in pairs, and are congregated towards the extremities of the branches. The timber is highly esteemed for strength and durability, and furnishes excellent planks for shipbuilding. It is also used for masts. Some of the other species mentioned above, such as the Spider Pine, or Gray Pin (P. Banksiana), generally only 3 to 10 feet high, which begins to appear in the northern parts of the United States upon high mountains, and is interesting as an American species, is mentioned by another name. The Yellow Pine (P. variabilis, or P. millos) abounds in the Atlantic states from North Carolina to Virginia. It is a tree 50 to 60 feet high, 15 to 18 inches in diameter at the base, with leaves 4 to 5 inches long, usually in pairs, but sometimes in threes, produced on the younger branches. Its wood is very extensive used for shipbuilding, and is largely exported to Great Britain. At Liverpool it is known as New York Pine. The Jersey Pine, or Scrub Pine (P. nigra), abounds in the lower parts of New Jersey, and thence to the south-west. The trees attain great heights, 1 to 2 inches long, the cones armed with strong spines. The tree is rarely 30 or 40 feet high. Great quantities of tar are made from it in Kentucky. The Pitch Pine (P. rigida) is a native of the northern and middle parts of the United States, often growing in great mazy swamps, and attaining a height of 40 to 80 feet, and a diameter of 2 feet at the base. The leaves are in threes, varying much in length, as the cones do in size. Immense quantities of it are used for fuel. Tar and lampblack are sometimes made from it. The Loblolly or Old Pine (P. abies), grows in dry and sandy soils, and is employed in the southern states, often occupying lands exhausted by cultivation. Vast tracts never cultivated in the southern states are Pine Barrens, in great part covered with this species of pine. It attains a height of 80 to 100 feet, and upwards, and has a wide spreading crown. The leaves are 6 inches long, in threes, sometimes in fours on young branches, the cones 4 inches high, with strong spines. The timber is not of much value. The Long-leaved Pine, or Southern Pine (P. palustris, or P. australis), is perhaps the most important of North American forest trees. It furnishes the greatest part of the tar, resin, pitch, and turpentine used in the United States. The timber is also very valuable, and is much used for shipbuilding. In England and the West Indies it is known as Georgia Pitch Pine. The tree attains a height of 60 to 70 feet, and a diameter of about 16 to 18 inches; the leaves are in threes, and about a foot long, the cones 6 to 8 inches long, and 4 inches in diameter, with small spines. The seeds are sometimes eaten. The White Pine (P. strobus) is a native of New England and the Weymouth Pine, from its having been largely planted by Lord Weymouth, attains a height of 150 feet, and a diameter of 5 feet and upwards. It has lax sub-triangular leaves in groups of five, and pendulous cones 4 to 5 inches long, with thin smooth scaling, and a fresher odour, and is cultivated on the continent of Europe for its beauty. In its native country it abounds chiefly from lat. 47°
to lat. 43°, and southward to the Alleghanies. The timber is not strong, but easily wrought and durable. Of the species belonging to the northern United States, the most magnificent is _P. lambertiana_, which is found on the Rocky Mountains between lat. 40° and lat. 43°, chiefly on sandy soils. It attains a height of 150 to 200 feet, and a diameter of 7 feet and upwards, almost to 20 feet. The trunk is remarkably straight, and the branches for two-thirds of its height; the leaves in fives, the cones upwards of a foot long. The timber is white, soft, and light; and the tree produces great quantities of a pure amber-coloured resin, which, when the wood is partly burned, is changed into a substance of a rich golden colour, used by the Indians as a substitute for sugar. The seeds are eaten either roasted or pounded into coarse cakes. _P. flexilis_ is found on the Rocky Mountains, near the head-waters of the Arkansas, and occurs almost to the limit of perpetual snow. It has a dense crown formed of numerous and remarkably flexible branches. The leaves are in fives. The seeds are used as food by hunters and Indians. _P. ponderosa_, another native of the Rocky Mountains, is a magnificent tree, remarkable for the hardness of its timber, which almost sinks in water. The leaves have ten rays, and the cones 14 inches long. *P. sabiniina, P. coulteri*, and _P. tussigina_ are also noble species from the west of North America.

The Himalayas abound in pines, some of which rival in magnificence those of North-west America. The Bhutan Pine (_P. exelsa_), much resembling the Weymouth Pine in its botanical characters, and attaining a height of 90 to 120 feet, abounds in Bhutan, although it is not found in the neighbouring countries of Sikkim and Nepal. The wood is highly valuable, being durable, close-grained, and so resinous as to be used for flannel, and candles. The Cheer Pine (_P. longifolia_) of India is a tree of remarkable and most graceful appearance, with leaves in threes, very long, very slender, and generally pendulous. It is abundant on the crests of hills in the lower Himalayas, growing at a height of 8,000 feet. The threes are cultivated in some parts of India as an ornamental tree. It is much valued for its resin. The wood is used in India as a substitute for European deal. The Khassa Pine (_P. khassiana_) is peculiar to the Khasia Mountains, and has commercial application. The tree is a large one, the cones of the third kind. _P. gerardiana_, a species with leaves in threes, is a large tree, a native of Nepal. The seeds are fertile. The mountains of India and the north-western parts of America produce numerous other species; Mexico has a number of very fine ones peculiar to itself; the mountains of St Domingo have one; the Canary Islands have one; China and Japan also have some. Most of those which have been named, and a number of others, are now readily to be procured in nurseries in Britain, although some of them only at prices which prevent any attempt at extensive plantation. Some wealthy noblemen and gentlemen devote a portion of their grounds to a collection of different kinds of pine, called a _Pinetum_. A few foreign species have become pretty common in plantations. Most of them thrive quite handsomely in Britain, but this is not the case with the more abundant and beautiful species of the Mexican species. The name pine is often popularly extended, and even in scientific works, to other Conifera; many trees called pine being properly treated at fir.

**PINEAL GLAND.** This term is in general use for the timber of the pine-tribe (see _Conifera_), and is not confined to that of the genus _Pinus_, but embraces the wood of species of _Abies_, _Larix_, _Araucaria_, _Dacrycarpus_, &c. From the Baltic ports come red wood and white wood. The former is yielded by the Scotch Fir (_Pinus sylvestris_), and the latter by the _Pinus strobus_. This wood is best known in America as white pine, but in Great Britain, and in commerce generally it is called yellow pine. Commercially it is the most important timber of Canada and the eastern states of America. The yellow pine of this part of America is the _Pinus mitis_, also a valuable timber-tree. The red pine (_Pinus resinosa_), found from Canada to Pennsylvania; it is intermediate for durability between white pine and pitch pine. The celebrated pitch pine of the eastern states of America is the product of _Pinus rigida_. It is used for ships' masts and yards, and for purposes requiring great strength and durability, in both of which qualities it excels most others of its kind. The kinds above mentioned are those which constitute the greater part of the pine-timber used in ship and house building, carpentry, &c. in Great Britain and the eastern side of America. The _Pinus longaeva_ of the Cordilleran (see _Cordilleran Pine_ (_Pinus Laricio_)) and the Sessile Pine (_Pinus Pinaster_) are greatly used. In Central and Southern Europe, from the pine-timber is chiefly yielded by the _Stone Pine_ (_P. pinea_) and the _Catalan Pine_ (_P. brutia_); that of Spain is from the Pyrenean Pine (_P. uncinata_). In Germany, and especially in Austria, the _Black Pine_ (_P. austrinica_) furnishes the greatest portion; but the fine-grained, soft white pine, or deal, so much used for sounding-boards of musical instruments, is the wood of the Silver Fir (see _Fir_). The trade in this timber is very great, for not only do the Germans use it almost exclusively in their vast toy manufactories and for Lucifer matches, but considerable quantities are exported. The finest is cut in the forests of Bohemia, where large establishments are formed for dressing and preparing the wood for various purposes.

Several other kinds of pine-timber are imported into Europe, but those mentioned form the great staples of the timber-trade. The chief value of this class of timber-woods is in the combination of lightness and strength with softness of texture and ease in workmanship, which makes them most serviceable for small articles. In this respect, in fact, the principal materials of European and American builders, and are used more than all other kinds of wood together. Much confusion prevails as to their common designations, for in Britain alone fir, pine, and deal are terms applied to all and each of them, according to the caprice of the individual. The first two names are used because the material is derived from one or other of those genera; but the last is a misnomer altogether, as the term deal belongs only to pieces of fir or pine timber not to particular sizes: they are 3 inches in thickness, 9 inches broad, and of variable length; if of less width, they are called _bottees_. See _TIMBER_.

**Pineal Gland.** A rounded body about the size of a pea, of a slightly yellowish colour, situated upon the anterior pair of corpora quadrigemina, and connected by a stalk passing upwards to the second, or posterior division of the third ventricle. It contains small cavities in its interior. The function of the gland has long been matter of speculation. It was regarded by Descartes as the seat of the soul. It has been recently discovered to be a part of the nervous system, consisting of a number of elements of which can be distinctly traced in some of the lower vertebrates.
Pine-apple, or Ananas (Ananassa sativa), a plant of the natural order Bromeliaceae, highly esteemed, and much cultivated for its fruit. The fruit is a *sorosis*, formed by the calyces and bracts of a close spike of flowers, becoming succulent and combined. This is the distinctive character of the genus Ananassa. The pine-apple has a number of long, serrated or smooth-edged, sharp-pointed, rigid leaves, springing from the root, in the midst of which a short flower-stem is thrown up, bearing a single spike of flowers, and therefore a single fruit. From the summit of the fruit springs a crown or tuft of small leaves, capable of becoming a new plant; the pine-apple, in cultivation, being propagated entirely by crowns and suckers, as, in a state of high cultivation, perfect seed is almost never produced. The pine-apple is a native of tropical America; it is found wild in sandy maritime districts in the north-east of South America, but it has been very much changed by cultivation. It has also been gradually diffused over tropical and sub-tropical countries, and not only as a cultivated plant, for it is fully naturalised in many parts both of Asia and Africa. It delights in a moist climate, and consequently does not succeed well in the dry climate of the south of Italy, although the warmth is sufficient. The first particular account of the pine-apple was given by Oviedo in 1535. It was in Holland that it first began to be cultivated in hothouses; but it was introduced into England from that country in 1699, and first cultivated by Mr Bentinck, ancestor to the ducal family of Portland; and its cultivation rapidly became general in the gardens of the wealthy. It is only since the peace of 1815 that it has received similar attention in continental Europe. Great care is requisite in the cultivation of the pine-apple, which without it is generally fibrous and coarse, with little sweetness or flavour, and with it one of the most delicate and richly flavoured of fruits. Its size, too, very much depends on cultivation, but there is also considerable difference in the size of the fruit in different varieties, the largest not being always the most luscious and superior in flavour. The size varies from 2½ lb. to 12 lb. in weight. The pine-apples grown in British hothouses are generally much superior to those of the West Indies, because the latter grow almost or altogether without cultivation; but the importation of pine-apples from the West Indies has now been carried on to a considerable extent, and, as it promises to add to the sources of wealth for these colonies, this has led to greater care in cultivation there, and consequent improvement of quality.

Formerly the culture of the pine-apple in Britain was a costly and extremely tedious process. Since very early after its introduction it has always been cultivated in hothouses specially appropriated to be called pine-apple houses, which were heated by smoke-flues, with tanners' bark or oak-leaves and dung for bottom heat. But by the universal adoption of hot water in horticultural heating the labour and cost attendant on those clumsy expedients have been much reduced and better results attained. Along with this there has been brought about a more rational treatment of the plants. Instead of high tropical ground and atmospheric heat being maintained in winter, which resulted in destroying the roots of the plants in the preliminary stages of their growth, and so retarded or deferred their fruiting period, the skillful pine-apple grower now finds that success is best assured by adopting a minimum of 60° of air-warmth and 75° of bottom-heat at that season. By these and other improvements in treatment superior fruit is obtained in half the time formerly considered necessary. The pine-apple is cultivated in pots or planted out in beds. It is more completely under control in pots than planted out, hence the results are always more certain when it is grown in that way. It is propagated by suckers and by the crowns that are formed at the base of the fruit when the cases of varieties which produce the former too sparingly for the requirements of stock, the latter are usually rejected because they do not make so good plants nor fruit so quickly as a rule. The varieties of the pine-apple that are worthy of being cultivated in Britain are few. For producing superior fruit in winter the Smooth Cayenne and Black Jamaicar are two of the best and most reliable, and the Queen, of which there are several sub-varieties, is the most highly esteemed for summer fruiting. Turfy, fibrous, sandy loam that has lain in a stack for nine or twelve months must be used, firm, loamy, bricks, &c. Pop. (1900) 11,496.

**Pine-apple Oil**, see BUTFYRIC ETHER.

**Pine-beetle.** See BARK-BEETLES.

**Pine Bluff,** capital of Jefferson county, Arkansas, is built on a high bluff on the south bank of the Arkansas River, about 120 miles from its mouth, and 43 miles by rail SSE. of Little Rock. It contains large ironworks, ships a good deal of cotton, manufactures much woolen stuff, and has oil, flour, lumber, bricks, &c. Pop. (1900) 8,592.

**Pine, PHILIPPE,** a Parisian physician (1745–1826) who gained for himself undying fame by his reformation of the old barbarous methods of treating the insane. See INSANITY.

**Pineo, ARTHUR WING,** born in London in 1835, studied law, but in 1854 made his début on the stage at Edinburgh, and in 1875 joined the Lyceum company. He is best known as the author of a number of successful plays, including *The Squire* (1881), *The Roquet* (1883), *Sweet Lavender* (1888), *The Second Mrs Tanqueray* (1893), and *The Notorious Mrs Ebanks* (1895).

**Pineole, or PINEGEOl,** a town of North Italy, at the east foot of the Alps, 23 miles by rail NW. of Turin. Originally a town of Savoy, it was regarded as the key of Italy. In its strong citadel, the Man with the Iron Mask, Lanzun, and Fouquet were imprisoned, and in 1674 he gave his favourite grandson his crown of gold hands from 1536 to 1574, again from 1630 to 1696, from 1704 to 1706, and from 1801 to 1814. The town contains a cathedral and a technical school. Cloth, paper, leather, cotton, and silk are manufactured. Pop. 12,093.
Pine-tree Money, silver money coined at Boston, Massachusetts, in the 17th century (from 1652), and so called from the coin's bearing the rule figure of a pine-tree on one side.

Pine-wool. See Fibrous Substances.

Pink (Dianthus), a genus of plants of the natural order Caryophyllaceae, of which there are many (some 290) species, annuals and perennials, with beautiful and often fragrant flowers, chiefly native of Europe and the temperate parts of Asia. The calyx is tubular, 5-toothed, with two or four scales at the base; there are five petals suddenly contracted at the throat of the corolla into a linear claw. There are ten stamens, and one ovary with two styles, the stigma cleft, and one- seeded. The exquisite beauty of the flowers has attracted admiration in all ages; and some of the species have long been much cultivated in gardens, particularly the Garden Pink and Carnation (q.v.), which are often referred to one original, the Clove Pink (D. Caryophyllus), a native of the south of Europe, growing wild on rocks and old walls, and naturalised in some places in the south of England; whilst some botanists refer the garden pinks with more probability in part to the Maiden Pink (D. deltoides), a pretty common British species, and a wild Dianthus pinks to the Feather Pink (D. plumarius), a native of some parts of continental Europe. The varieties of the garden pink and the pheasant-eye pink, which are usually designated the florists' pink, are of much less antiquity than the carnation as garden ornaments. Othier scarcely mention them, while in Parkinson's time they appear only to have been cultivated as other hardy perennials and annuals were, without any special care. Their capabilities as choice florists' flowers were recognised about 1810, and the number of varieties has since then greatly increased to nearly 500. Nearly all of them are species, found in moist places in some parts of Europe, and not unfrequently to be seen in flower-borders. It has very fragrant flowers. Both single and double pinks are generally propagated by sowing, which are short cuttings of the younger shoots. They also sow the seed in suitable propagating layers. A rich loamy soil is the best for pinks. The Maiden Pink is a small, much-branched plant, growing in grassy places, on gravelly and sandy soils; it has rose-coloured flowers spotted with white, and a white eye encircled by a deep purple ring. The Pink (D. purpurea) and the Clustered Pink, or Chilbing Pink (D. prolifer), also natives of England, differ from these in being annuals, and in having clustered flowers. The Bearded Pink, or Sweet William (D. barbatus), a native of the middle of Europe and the south of France, with laceolate leaves, flowers crowded in dense clusters at the top of the stem, annunated bracts, and bearded petals, has long been a favourite garden-flower, still retaining its place alike in palace and cottage gardens. Although perennial, it is sown annually by florists, to secure fine flowers, and the flowers are much admired, single and double, exhibiting much diversity of colour. The Mule Pink, or Fielding's Pink, a choice kind, is supposed to be a hybrid between the Sweet William and the Pheatee. The Indian Pink, or China Pink (D. chinensis), is now also common in flower-gardens. The flowers are very regular, and are supposed as possessing medicinal properties, and was used in nervous maladies. See F. N. Williams, The Pink of Central Europe (1890). — Sea-pink is a common name of Thrift (q.v.).

Pinkerton, John, an acrid little book-maker, was born at Edinburgh, 17th February 1758, and after six years' schooling at Lanark, and five years' irksome apprenticeship to a W.S., in 1780 settled in London as a man of letters, in 1802 in Paris, where he died in indigent circumstances, 10th May 1826. His twenty-four works and compilations include some mundane-architectural and historical, See Essay on Medals (1784); Letters on Literature (1786), marked chiefly by a novel system of inflection and orthography, but were the means of introducing him to Walpole and Gibbon; Ancient Scottish Poems from the Ms. Collections of Sir Richard Maitland; the Panegyric on the Duke of York; Origin and Progress of the Sycophants or Goths (1787), in which he first fell foul of the whole Celtic race; Inquiry into the History of Scotland preceding the Reign of Malcolm III. (1790); Iconography Scotiae (1790-97); History of Scotland from a National Point of View (1797); Walpoleiana (1799); Modern Geography (1802-1807); Voyages and Travels (16 vols. 1808-13); New Modern Atlas (1809-15); and Petroleum, or a Treatise on Rocks (1811). See his Literary Correspondence (3 vols. 1830).

Pink-eye is a name commonly given to an ophthalmic affection which prevails among horses, and is called by veterinarians Epizoic Cellulitis; also Rheumatic Inflammation, or sometimes Mucous Enterosis. The disease, which of late years has assumed a more virulent form, prevails during a continuance of wet weather, especially when it is also cold, and attacks in a number of animals in various parts of a town or district almost simultaneously, thus proving its atmospheric origin; but, although it thus breaks out spontaneously, there is no doubt of its being an infectious disease. The primary symptoms are loss of appetite, dulness, perhaps rigors, with fever, manifested by elevation of the temperature varying from about 104° to 107°, or, in very severe cases, even 108° F., and acceleration of the pulse. In slight cases the pulse may be 65, in very severe ones over 100 beats per minute. These symptoms are succeeded—but not always—by swelling of the eyelids and redness of the eye—hence the term pink-eye—pain in and stiffness of the lids, with tenderness, particularly around the joints. The swellings are at first limited, but soon extend upwards and downwards from the joints affected, and their occurrence gives rise to the term pink-eye. The lids become disordered; there is generally constipation at first, the faces are covered with much mucus, and in many instances there is some degree of colicky or intestinal pain. Some horses have a loud, hoarse cough, at first dry, but often becoming moist; but lung complications are not common. The disease, once established, usually becomes very feeble, though the animal presents no other bad symptom, the pain having left the limbs, the appetite returning, the swellings diminishing, and the secretions regaining the normal condition; whilst an ordinary observer is confident of a rapid recovery, the animal suddenly dies, and a post-mortem examination reveals the presence of ante-mortem clots of blood in the cavities of the heart, and perhaps in the great pulmonary blood-vessels. To the veterinarian the apparently convalescent stage is a most critical period, and he must endeavour, by roasting the heart's affection, to prevent the formation of these conglutn.

As a rule the disease runs its course favourably in from four to ten days, leaving the animal with more or less loss of condition and strength, but both sound and restored by gentle exercise. The treatment which has proved most successful is based on the conclusion that the disease runs a definite course, and that all attempts to check this are calculated to do more harm than good. It is most important that all who have the care of horses should know that it is most dangerous to work a horse when this disease prevails after
he has manifested the slightest loss of appetite; many horses turned to wood after failure of appetite have been brought back a few hours after in a dying condition. The medicines made use of are those which moderate pain if excessive, keep the contents of the stomach and bowels from undergoing putrefactive fermentation, and act as very slight aperients; and, when the heart’s action threatens the condition above described, cardiac stimulants, such as the bicarbonate of ammonia, given in a ball. Alcoholic stimulants, in virtue of their irritating properties and their effect on the nervous system, are very injurious, and should not be employed, except in an emergency, in any other disease where the so-called fibrinous state of the blood is one of the conditions.

**Pinkle.** A battle fought on 10th September 1547 near Muscelburg in Midlothian between 14,000 English under the Protector Somerset and twice that number of Scots. The latter were utterly defeated—more than 10,000, it is said, being killed on the field and in the pursuit, whilst the English loss was barely 200.

**Pink Root.** See Spigella.

**Pinn, a genus of bivalves, not far removed from mussels (Mytilidae). The shell is acutely triangular, beautifully translucent, and in some species measures two feet in length. The attaching byssus by which it is fastened to the substratum (the *byssus nubilis*), is very long and silky, and admits of being woven into fabrics. So the ancients occasionally used it, and, to gratify the curious, byssus-gloves, &c. are still made at Taranto and elsewhere. The animal is sometimes eaten. It lives from low-water mark to sixty fathoms.**

**Pinace.** See Boat.

**Pinipedia.** See Seal.

**Pinock, William (1752–1843), who is famous in the educational world as the originator of the formerly well-known catechisms which bear his name. To Samuel Maunder (q.v.), his brother-in-law, he was chiefly indebted for the production of the catechisms, which finally extended to 12 volumes, or 83 separate parts. Histories of England, Greece, and Rome ran through over a hundred editions. His son, William Henry Pinock, LL.D. (1813–85), vicar of Pinner, studied at Cambridge, and wrote on church law and church history.**

**Pinos, Isla De, an island of the West Indies, southeast of Cuba, of small extent upon the Florida Keys, 1214 sq. m. The coast has many bays. The surface is partially mountains (1600 feet), and has extensive plains; a marsh divides it east and west. It produces cattle, tobacco, lumber, turpentine, pitch, tar, marble, tortoise-shell, silver, quicksilver, iron, &c. Capital, Nueva Corona. Pop. (1899) 3199. It was discovered by Columbus in 1494, and was long a notorious port for pirates.**

**Pins.** The earliest kinds of pins were probably thorns or the small bones of fish and other animals. Among the remains found on the sites of the prehistoric lake-dwellings of Europe there are numbers of bone pins, some of a rude and others of an elegant form. The great majority of the pins in these ‘finds’ are, however, of bronze; but a few of copper and one of iron have also been discovered. It is estimated that 10,000 pins have been collected at the lake-dwellings of Seerohr in Switzerland alone. They seem to have been chiefly used as hair-pins, though no doubt they were also employed to fasten the dress, and for other purposes. The forms of these ancient pins are extremely varied, and in the numerous places where they have ornamented heads the manner and use are curious and beautiful. A few have double stems like modern hair-pins, and three found at Peschiera are exactly the same in form as the ‘safety pins’ which have come largely into use in the present year. Many of these single stemmed ones are baluster shaped—i.e. they are thicker at some places than at others. A good many both of bone and of bronze have a head formed of a loose ring in an eye. Some have bulbous heads (these occasionally being of amber) very like the safety-pins of the present time. For numerous illustrations of these ancient pins, see Munro’s *Lake-dwellings of Europe* (1890).

Among ancient articles for the toilet found in Egypt some pins with gold heads occur, and ancient Roman bronze pins and bone hair-pins, adorned with ornamentation of this kind, have been found at Pompeii. As regards modern pins, it was about 1840 that the solid-headed kind now in common use took the place of the older form of pin, which had a globular head of fine twisted wire made separately and screwed to the shank by compression from a falling block and die. These old pins had the disadvantage of frequently losing their heads. They were made by manual labour in such a way that each pin passed through the hands of fourteen different persons (see Division of Labour).

Solid-headed pins are made of an improved form of a machine which was patented in England by an American, named L. W. Wright, in 1824. But before this machine was perfected enough to do its work properly many thousands of pounds were expended upon it. Pins are made by the modern machine in this way: Pinners draw from a reel of wire a length sufficient to make a pin, which is at the same time straightened by passing between fixed studs. The pin length is seized by lateral jaws, from which a portion of the wire is left projecting. A snap head die next advances and partially shape the head; the jaws or grippers then release it, and the pin is pushed forward again about a twentieth of an inch, when the head gets another squeeze of the die. These movements of the machine are repeated once more to fasten the head, and the wire is then cut to the length of a pin. The headed blanks drop into a receptacle and arrange themselves in the line of a slot formed by two inclined and bevel-edged bars. The opening between the bars is just wide enough to let the shank of the pin fall through, so that by the action of the machine the blanks become suspended by the head in a row along the slot. When the blanks reach the lower end of the inclined bars they are caught, still hanging downwards, between two parts of the machine (one of which has a sliding movement), and passed along, rotating as they move, in front of a cylindrical cutter, with sharp grooves on its surface, so that it acts like a file, and shaped the pins. The annexed figure from the *Engineer* of June 3, 1857, shows this part of the machine, which makes pins at the rate of 160 per minute.

Ordinary pins are made of brass wire, and when these are finished by the machine they are cleaned of grease and other matters by boiling them in weak beer. The pins are next coated with tin, or ‘coloured,’ as it is called. In this process alternate layers of pins and grain-tin are placed in a copper pan, to which is added a small quantity of grain-tin and crude tartar (bitartrate of potash). When heat is applied a solution of tin is produced from which the metal is deposited on the surface of the
pins, giving them their silvery white colour. The tin surface is afterwards brightened by shaking them in a bag or barrel with bran or sawdust. Pins are 'papered' by a self-acting machine not less ingenious than the one by which they are made.

For mourning pins iron wire is used, and these are either ‘blueed’ by heating them in a muffle till the proper tint is obtained, or made black by coating them with a suitable varnish, which is afterwards hardened by stoving the pins.

The finest pins are those made of hair-like wire for insect-collectors. ‘Blanket’ pins are about 3½ inches long, and various sizes between 1½ inch and ⅙ of an inch in length are made for domestic use. Safety pins with the point resting in a loop, now so much used in the nursery and for other purposes, were, as already stated, made in prehistoric times; at least pins of exactly the same form were. The manufacture of pins is largely carried on at Birmingham, and to a lesser extent at London, Warrington, Stroud, and Dublin. They are also extensively manufactured in the United States—chiefly in Connecticut.

**Pinsk**, a town of west Russia, stands in the midst of what were formerly vast marshes (in large part drained since 1875), on a branch of the Priepet, 98 miles by rail E. of Brest-Litovsk, manufacturers leather, and has a large transit trade. Pop. 32,408, two-thirds being Jews.

**Pinzuti, Ciro**, musical composer, was born at Sinalunga, near Siena, on 9th May 1829. He studied music at Bologna (1843), and was a special pupil of Rossini. From 1848 to 1885 he lived in England as teacher of singing, chiefly at London and Newcastle. From 1856 he taught singing at the Royal Academy of Music. As a composer he wrote charming music for songs (more than 300 in all). In celebration of the union of Tuscany with Italy in 1859 he composed a Te Deum, but was not successful as a writer of larger musical compositions. He died at Florence, 10th March 1888.

**Pint**, a measure of capacity used both for liquids and dry goods, and equivalent to the eighth part of a Gallon (q.v.), or 34.6925 cubic inches. The Scotch pint, superseded as a legal measure by the imperial pint, was equivalent to 3.005 imperial pints.

**Pintado.** See Guinea Fowl.

**Pintail** (*Anas acuta*), a genus of ducks, one handsome species of which (*A. acuta*) is a winter visitor to many parts of the British coast. It is a native of all northern regions, is elongated in form, and very rapid in flight. Its flesh is much esteemed.

**Pinto, Fernão Mendes**, Portuguese adventurer, born at Montemor-o-Velho, near Coimbra, about 1510. When twenty-seven years of age he made his way out to India, and remained twenty-one years in the south and south-east of Asia, leading the life of an adventurous sea-man, fighting pirates at one time, trading at another, and again being employed on special missions to Japan or elsewhere, his fortune often fluctuating between great wealth and poverty. He returned home to Portugal in 1558, spent much time in writing an account of his adventures, adding to them embellishments and gross fictions, and died at Almada near Lisbon, probably in 1583. His travels—*Peregrinationes*—were not published until 1614, but have since then been translated into several European languages—into English by F. Cogan in 1663. See a new abridged edition of those travels, with an introduction by A. Vambéry (1891).

**Pinturicchio**, whose proper name was BERNARDINO DI BETTI, was a painter, born at Perugia, in 1454. An assistant to Perugino, he helped him with the frescoes in the Sistine Chapel at Rome, and then spent the best part of eight years (1484—91) in Rome and Naples, decorating the walls of the chapels of Santa Maria del Popolo in Rome. After executing two pieces in the cathedral at Orvieto he decorated the walls of what is now the Vatican library with a series of six frescoes; this occupied him six years (till 1498). On the walls of St Maria in Arno at Florence he illustrated the Life of St Bernardino of Siena. Other frescoes by his brush adorned two churches in Spello, the Petrenzi Palace at Siena, and the cathedral library in the same city, this last series illustrating the life of Pope Pius II. All these works are admirable examples of decorative art. Pinturicchio painted a few panel pictures of high merit, as Christ bearing the Cross, two Madonnas enthroned (at Perugia), Coronation of the Virgin (in the Vatican), and others at Siena, Florence, and Spello. He died at Siena, 11th December 1513.

See Life by Veremighioli (Perugia, 1837), two monographs by Schwarzow (Stutt. 1880 and 1882), and Milanesi's *ed. Florence, 1878* (of Vassari, vol. iii).

**Pinwell, George John** (1842—75), born in London, drew on wood, did book Illustration, and after 1865 became water-colour painter of great eminence.

**Pinzon, the discoverer of Brazil (q.v.).**

**Piorre**, the notorious rookery ('Synanthus piorre', under the leads') of the state-prisons of Venice (q.v.), in which Casanova and many other notable prisoners were confined. The heat in summer and the cold in winter are said to have been intense. Of late it has been asserted that they must have been comparatively pleasant abodes.

**Piombo,** a former principality of Italy, lies along the coast opposite the island of Elba, the greater part of which belonged to it. Its extent was 139 sq. m.; and its population, previous to its incorporation with Italy in 1860, about 25,000. Piombino, originally a lief of the empire, came in the 8th century into the possession of the Appiani, who, after ruling it for nearly 200 years, made way for the Brunswick family, who were expelled by Napoleon in 1801; but after the Congress of Vienna the principality was put under the suzerainty of Tuscany. The town of Piombino (pop. 4000), on a promontory 50 miles N. of Leghorn, has iron-rolling mills.

**Pombo.** See SEBASTIAN DEL.
that may be necessary. One is selected from each company. Instead of a rifle it carries a sawbacked sword, an axe, and two gun-spikes, other necessary tools being distributed among them.

_Cowboy Pioneers_, one from each troop, are instructed at the School of Military Engineering, Chatham, in the best method of rapidly destroying railways and telegraph lines, etc., and carry gun-cotton and the tools necessary for this purpose.

_Piotrkow_ (Ger. _Petrikau_), a town of Russian Poland, 87 miles by rail SW. of Warsaw. Cotton and wool spinning is largely prosecuted. It is one of the oldest Polish towns; here in the 15th an 16th centuries were held the elections to the Great Seals elected. Pop. 24,866. —_The government_ has an area of 4730 sq. m. and a population of 1891,1,200,197, and is the centre of a cotton and woollen industries, of brandy-distilling, and of corn-milling.

_Piozzi_, Mrs. more famous as _Mrs Thrale_, and by that name to be remembered until Dr Samuel Johnson is forgotten. Her maiden name was Hester, _Piozzi_, daughter of a wealthy family at Bodvel in Carmarthen-shire, January 27, 1741. She early gave promise of quick parts and lively disposition, and received an education that extended even to Latin as well as French, Spanish, and Italian. Early introduced into the world of literature, in 1763 she married Henry Thrale, a prosperous Southwark brewer, thirteen years her senior. He was an honest man, and made an indulgent, if somewhat indifferent, husband; but he was uncommunicative and phlegmatic in temperament. Mrs Thrale's acquaintance was wide, and through the kind offices of Mr. Smollett in January 1765, and one of the most interesting friendships in the history of letters at once began. The sage quickly conceived an extraordinary affection for his "mistress," was domesticated in her house at Streatham Place for over sixteen years, and for her sake learned to soften many of the eccentricities of his speech, dress, and behaviour. Of all his friendships this was the one most valuable to him, for _Mrs Thrale's_ warm woman's heart and constant cheerfulness henceforward brightened and gladdened all that had hitherto brought out little happiness. Thrale also had a solid esteem for Johnson, carried him with the family to Brighton, to Wales in 1774, and to France in 1775, and left him £200 as one of his four executors. He was returned to Southwark at a by-election in the end of 1765, and sat continuously until the election of 1769. Boswell first visited Streatham in October 1769, Fanny Burney in August 1778. In 1772 Thrale's affairs became embarrased, but his wife's tact and energy and the timely advances of friends enabled him to ride over the crisis. Thrale died in April 1781, and three years later the brewery was sold for £155,000. _Mrs Thrale_ had borne him twelve children, but her only son died in 1776, and she had but five daughters living at her husband's death. Dr Johnson's health was now declining, and he soon Johnson's acquaintance was broken. _Mrs Thrale_ showed no signs of suffering from the blow. She returned to Streatham for Bath in October 1782, and a few letters on the subject of the marriage passed between Johnson and herself in November 1782. The correspondence shows to more advantage than the sage. But where Johnson loved he loved deeply, and that

with a love that could bear no rival near the throne. "A friendship of twenty years," he writes, "is interwoven with the texture of life. A friend may be often found and has yet an old friend never can be found, and nature has provided that he cannot easily be lost." The marriage, for some time postponed, actually took place at Bath, 23rd July 1784, and the couple, twenty and twenty, have travelled through France, Italy, Germany, and Belgium, returning to England early in 1787. Piozzi proved an offensive husband, managed their finances with prudence, and her daughters were at length reconciled—the eldest, _Dr Johnson's_ _Queenie_, married Leyland, 1784. A second _Piozzi_ married Johnson to Streatham in 1790, but soon after built Brynella on the banks of the Clwyd. Here _Piozzi_ died in 1809, and here his widow remained till 1814, living thereafter at Bath, Clifton, and Penzance. When in 1820 Mrs _Piozzi_ broke her leg while traveling from Penzance to Clifton, and died after ten days of suffering. She was buried beside _Piozzi_ in the little church in Streatham. "Her family," as _Mrs Thrale_ was vivacious, frank, witty, thoroughly feminine, and charming, if somewhat wanting in refinement. She was pretty, if hardly beautiful—her face gave Hogarth his model in _The Lady's Last Stake_, but the best portrait is that by Sir Joshua Reynolds. _Piozzi_ lived in the same house with Mrs _Thrale_ and Horace Walpole all abused her; but she lives secure of immortality in the love of _Samuel Johnson_, and in the happiness she brought into nearly twenty years of a life radically wretched._

Mrs _Piozzi_ had a fatal facility in composition, but two of her books at least live through their subject, and indeed are only less interesting than Boswell himself: _Anecdotes of Dr Samuel Johnson during the last twenty years of his life_ (1786; reprinted in Mrs _Napier's_ _Johnsoniana_, 1881, and _Letters and _Journals_ of _Dr Johnson_ (2 vols. 1789). Her _Observations and Reflections made in a Journey through France, Italy, and Germany_ (2 vols. 1789), _British Synonymy_ (2 vols. 1794), and _Retrospection, or a Collection of the most striking Events, &c._ (2 vols. 1801) are long forgotten. Of her poems the _Three Warnings_ survives—it was first printed in the _Miscellanies of Miss Williams_ (1756), a volume containing a prose-tale of Johnson's, _The Pantomime, the heroine of which, _Floresta_ was a study of _Mrs Thrale_. Her notes to _Wraxall's_ _Historical Memoirs_ were reprinted in the 1884 edition of that work, as well as in _Hayward's Autobiography, Letters, and Literary Remains_ by _Abraham Hayward_, in 1881 (2 vols.). See the Rev. _Ed. Mangan's_ _Piozziiana_ (1833), Boswell's _Life of Johnson_, Madame _D'Arblay's_ Diary, _Mr Hayward's_ _Introduction_, and _J. B. Sibly's_ _Mrs Thrale_ (1881).

_Pip_ is the name by which various diseases in both fowls and poults were once known, but since the affections of birds have been studied, and more accurate knowledge arrived at, this term is no longer in use. See _Roup_.

_Pippa_, a genus of amphibiens, of which the best known is the Surinam toad. See _AMPHIBIA_.

_Pipal_, a species of fig. See _PREPUL_.

_Pipe_, a measure of quantity commonly employed in Portugal, Spain, France, England, and in some other countries, used almost exclusively for wine and oil. In English it is also called a butt, and is divided into two hogsheads. But the capacity varies with the locality as well as with the description of wine the cask contains: a pipe of port is 137
Pipeclay.

Pipeclay, a fine white plastic clay, very like kaolin, but containing a larger percentage of silica. For the manufacture of tobacco-pipes the most desirable clay contains only small traces of limonite and alkaline earths. Clays of this nature are met with in Cornwall, Devon, and Dorset, but the purer varieties of clay used for pottery-making are also employed in the manufacture. Such clays, however, have siliceous materials added to them artificially. Pipeclay is used by soldiers for whitening belts, &c.

Pipe-fish, a family of remarkable fishes in the same (Lophobranch) order as the Sea-horses. The body is elongated like a thin pipe; the jaws are prolonged in a tubular toothless snout; the muscular development is slight; the skin is covered with an armature of hard plates; the gills are in the form of tafts, and the branchial aperture is very small. The eggs are carried about and hatched by the male, usually within a capacious pouch formed from two folds of skin on the ventral surface of the tail-region. One of the commonest British species is the Great Pipe-fish (Syngnathus acus), which is sometimes found in deep water, and sometimes at low tide among the seaweed in rock-pools. The specimens commonly seen are from 1 foot to 18 inches in length. It may be seen slowly moving about, with curious contortions, poking its long snout into every crevice in search of food, and sometimes assuming a vertical position with the head downwards, boring into or stirring the sand.

Pipe-fish (Syngnathus acus).

One of the commonest American pipe-fish is Siphonostomus pecki, which lives among the eelgrass of the coast.

The name Pipe-fish is sometimes given also to the fishes forming the family Fistularidae, or Plume-mouths, of which one of the most remarkable is the Tobacco-pipe-fish (Fistularia tubococera). But these are large marine sticklebacks, and have only a superficial resemblance to the true pipe-fish.

Piperaceae, a natural order of exogenous plants, natives almost exclusively of the hottest parts of the globe, particularly of Asia and America. About 600 species are known, to most of which the name Pepper (q.v.) is sometimes given, although some are also known by other names, particularly those of which the fruit is not used as a spice, but of which some part is employed for some other purpose, as Betel, Cubebos, Matico, and Ava.

Piperine, an Alkaloid (q.v.) found in pepper.

Pipercorns. See Records.

Pipes are made of various materials and for various purposes. Thus, we have draining-pipes for agricultural and sanitary purposes, made of earthenware, wood, and metal (see DRAINAGE, SEWAGE), pipes of various kinds of metals for a great variety of purposes, and Tobacco-pipes (q.v.) of various materials. Earthenware pipes are now made of almost every size, from an inch or two in diameter up to the enormous size of 54 inches. They are usually made of fire-clay, and are glazed like common Pottery (q.v.). Caoutchouc vulcanised and gutta-percha are also extensively used for making pipes. Lenthal pipes are used chiefly for the conveyance of water temporarily, as in the case of fire-engines (see FIRE). Metal pipes are made of iron, lead, tin, or an alloy of tin and lead, copper, brass, &c. Iron pipes, as for water and gas, are usually cast, and the manufacture is one of enormous extent. See Water-supply.

Pipes of ductile metal, such as brass, copper, and tin, are made by first casting an ingot into the shape shown in fig. 1, with a hole through its length of the same diameter as the bore of the pipe is intended to have. Into this is placed an iron rod, called the mandrel (a, fig. 2), which exactly fits, and which projects slightly at the tapered end (b, fig. 2). It is then brought to the drawing-table, and here the small end with its projecting mandrel is put into a funnel-shaped hole, drilled through a steel post (a, fig. 3), so as to allow the point to be gripped on the other side by a pair of pincers, at the end of a strong chain; the machine-power is then applied to the other end of the chain, and the soft metal and its mandrel are drawn through, the former being extended equally over the surface of the latter, which is then removed, and the length of pipe is complete. Some metals require repeated drawing through holes, getting gradually smaller, and have to be softened or annealed at intervals, as the metal hardens under repeated drawing. In this way brass, copper, tin, and pewter pipes are made; and a patent has also been taken out for making steel pipes; but lead pipes are made of great lengths by squeezing the soft metal through a hole in a steel plate in which there is a fixed core or mandrel projecting, which forms and regulates the size of the bore of the pipe. Pipes are also made from copper, brass, and malleable iron by rolling out narrow strips of metal, and then passing them successively through rollers, which are deeply grooved, and which turn up the edges (fig. 4). A mandrel is then laid in it, as in fig. 5, and it is next passed through double-grooved rollers, which turn the edges in, and thus form a complete tube round the mandrel. The edges, however, require hard soldering — i.e., soldering with a fusible brass alloy, or welding, if of iron. All boiler-tubes used to be made in this way; but the method of drawing has lately been so much improved that copper and brass pipes, or tubes, as they are frequently called, are now drawn of considerable thickness and diameter.
Piracy

Pipì, the name given to the ripe pods of *Cesalpinia-pupai* (see *Cesalpinia*), which are used in tanning, and are not unfrequently imported along with Dividivi (q.v.).

Piping Crow, a name somewhat loosely applied in Australia to any bird of the genus Gymnorhina or Barita (q.v.). Another modification of the name is Piping Crow Shrike or Piping Roller; the bird is also called Carrick.

Pipit (Anthus), a genus of small birds forming with the wagtails the family Motacillidae. The pipits have a strong resemblance to the larks in external appearance, and even in many of their habits, such as singing while on the wing; but they moult twice a year, while larks moult only once. With the same general habit except in colour, and like them they are chiefly terrestrial in habit, running along the ground, working in and out among grass or heather in search of the insects, worms and slugs which form their food. The Meadow-pipt (Anthus pratensis), also known as the Tilthark or Moss-chesper, is the species most abundant in Britain. It breeds early in spring, nesting in a hollow on the ground or under a bank, and rears two broods in a season. The Tree-pipt (A. trivialis), though only a summer visitor, is common in many districts, and breeds freely in the south and west of Scotland. The Rock-pipt (A. obscurus) frequents rocky shores and feeds on molluscs and small crustaceans.

Pippi. See Giulio Romano.

Pippin. See Petin.

Pippin, a name given to many varieties of apple, among which are some of the finest in cultivation, as the Golden Pippin, Ribston Pippin, &c.

Piqua, a city of Ohio, on the Miami River (here crossed by two bridges), 28 miles by rail N. of Dayton. It has foundries, oil-refineries, and manufactories of flour, furniture, mattresses, &c. (1900) 12,172.

Pique, a game at cards for two players, played with thirty-two cards, the sixes, fives, fours, threes, and twos being rejected. The game was formerly played a hundred up, a partie being the best of five games; but about 1800 the rubicon game superseded piqué au cent. At the rubicon game six hands are played, each player dealing alternately. The one whose aggregate score is the higher wins the partie. He deducts the loser's score, and adds a hundred to the difference. If the loser fails to score a hundred in the six hands, he is rubiconed, as the score is added instead of being deducted. For a description of the mode of play, handbooks should be consulted.

The earliest known mention of piqué is by Rabélais in the Gameanist list of games (1530-45). Hence it has been concluded that piqué is of French origin. But it is more probable that a similar game, called rongh, was played in Italy at an earlier date, and that this game, with modifications, travelled from Italy to Spain, where it was re-named *piquet* and to France, where it was re-named *piquet*. Piqué seldom, if ever, occurs in English books of the Shakespearian period, but *cent* (cents) frequently does. From this it may be concluded that piqué, under the name of cent, was played before the end of the 16th century, and in the middle of the 17th century, when the word *cent* went out of use, and was replaced by the word *piquet*. It may be noticed in this connection that from the time of the marriage of Mary to Philip of Spain (1554) the English equivalent of the Spanish name of the game was in use, and the marriage temporarily with the marriage of Charles I to the daughter of Henry IV, of France (1625) the French name *piquet* was substituted.

The etymology of piqué has been much speculated on; no satisfactory settlement has been arrived at. In 1661 was published *The Regall and Delightfull Game of Piquet*, translated from the earliest known French book on the subject. This was followed by several others, more or less resembling it, *Wit's Interpreter* (1671), *Cotton's Compleat Gamester* (1676), and *Seymour's Court Gamester* (1719), all containing piqué. The next original work was *Hoyle's Short Treatise on the Game of Piquet* (1744). This included the laws which were the authority until 1873, when the Portland Club issued a code. The general adoption of the rubicon game, shortly after 1800, necessitated a fresh revision; and in 1881 the Portland and Turf Clubs agreed to the code of laws which now governs the game. These laws were published in 1882, together with a treatise on the game, by Cavendish.

Piracy (Lat. pirata; Gr. πιρατας, 'an adventurer,' 'a pirate'); robbery on the high sea, was apparently very much mixed up with early maritime adventure, the sea-rover being frequently pirate as much as trader; thus, the Phoenicians often combined piracy with more legitimate sea-faring enterprises. The Huns, who in the 5th century, had accountèd a reputable or even dignified calling; and the Greeks, especially the Phocæans, long displayed a natural genius for piracy. This aptitude was cherished by the constant warfare between small states, it being difficult sometimes to decide what was piracy and what was private war. Cicero speaks of a time when the Mediterranean was long the headquarters of Mediterranean piracy, until in 67 B.C. Pompey made his memorable expedition against the pirates with great naval and military forces. From the 8th to the 11th century the Norse vikings were the terror of the western coasts and waters (see Norhtemen). The Hanseatic League (q.v.) had its origin in the desire for mutual defence against Baltic and other pirates. At a later date the Moslem savages scourged the Mediterranean, commingling naval war on the large scale with peddling, thievry, and the abduction of slaves: Algiers was a piratical stronghold till well into the 19th century (see corsairs); and in the 17th century the English Channel swarmed with Algerine pirates, who snapped up in one prize £300 worth of linen belonging to the Lord Deputy of Ireland, and being the king's representative, for weeks in an English port while he waited for a ship-of-war to convey him across the Irish Sea. In 1635 they actually entered Cork harbour, and carried off a boat with eight fishermen, ten cows, and three sheep. The Bucaneers (q.v.) preyed mainly on the Spanish commerce with the Spanish American colonies. Lundy Island (q.v.) was long a nest of pirates, English and other. Captain Kidd (q.v.) is in the popular mind the chief representative of the picturesque type of pirates, whose career of reckless bloodshed and rapine under their 'Jolly Roger' or
PIREUS

black flag, alternating with luxurious debauchery, has come to be surrounded with a halo of romance, reflected in E. A. Poe’s *Gold Bug* and R. L. Stevenson’s *Dr Jekyll and Mr Hyde*. The name *Pirate* was John Gow, who in January 1725 boldly anchored in Orcadian waters, and entered into friendly relations with the islanders, till, recognised as an atrocious villain, he was with his crew captured and carried to London to be tried. He and eleven of his companions were confined in a month or two after, and the pirate captain and nine of his men were executed together. So late as 1864 five men were hanged in London for murder and piracy. National prejudices tend to obscure the distinction between Privateering (q. v.) and piracy: Paul Jones was a pirate in England, and the commanders of the Confederate ships *Alabama*, *Seminole*, and *Florida*, which preyed on northern commerce, were in northern eyes practically pirates. Of late the pirates tried by admiralty courts are rather naval mountebanks than pirates in the old sense. The African slave-trade was not considered piracy by the law of nations; but the municipal laws of the United Kingdom and of the United States by statute declared it to be so; and in or after 1841 it was declared to be so by Austria, Prussia, and Russia. The home of professional piracy, happily now in abeyance, is the Malacca Archipelago and the China Seas; Sea-Dyaks and Malays disputing with Chinamen the palm of hardihood as sea-robbers.

Piracy is recognised as an offence against the law of nations. It is a crime not against any particular country, but against all mankind, and may be punished in the competent tribunal of any country where the offender may be found, or into which he may be carried, although committed on board a foreign vessel on the high seas. It is of the essence of piracy that the pirate state has not obtained permission from a sovereign state, or from one belligerent state at war with another. Pirates being the common enemies of all mankind, and all nations having an equal interest in their apprehension and punishment, they may be lawfully captured on the high seas by the armed vessels of any particular state, and brought within its territorial jurisdiction for trial in its tribunals; but it is not permitted to put pirates to death without trial save in battle.

The infringement of the Copyright Acts is often spoken of as literary piracy; and the word is now extended to cover the case in which the publishers of one nation issue unauthorised reprints by authors of another nation—especially the case of American reprints of English works (see BOOK-TRADE, Vol. II. p. 316). Thus, several pirated reprints of the first edition of this Encyclopaedia were issued and were being sold in 1890, in which obsolete facts and statistics twenty years old were reproduced with marvellous fidelity.

PIREUS (Gr. Peiraius), called also PORT UCARAC, the harbour of both ancient and modern Athens (q. v.). Planned by Themistocles and laid out by Hippodamus of Miletus, the Piraeus is built in the glorious days of Pericles; this ruler and Cimon before him built the three ‘long walls’ that connected Athens with its port (5 miles to the south-west), and so ensured a free and safe passage from one to the other at all times. It was both a war harbour and a commercial port, many foreign vessels lived with it. In ancient (built 347-325 B.C.) and fortiﬁcations were destroyed by Sulla in 86 B.C., and from that time the town sank into decay. The modern Piraeus, which has grown up since 1834, is a regularly laid-out but mean-looking town, which contains grain-mills, arsenals, docks, and manufactures of cottons, ﬂour, paper, iron, nails, ears, furniture, &c., and is growing rapidly. A railway (1869), 5 miles long, connects it with Athens. The foreign trade (£4,000,000 annually) is half that of all Greece. The imports are mainly coal and railway plant, &c., from Britain; petroleum from the United States, and sheep and cattle from Russia; and the exports, tobacco, valonia, hides, bones, horns, cheese, wool, &c. A total of 6000 vessels of 21 million tons enter annually, one-half the tonnage being in Greek bottoms. Pop. (1871) 11,009; (1879) 21,655; (1890) 38,500.

Pirano, a seaport of Austria, on a promontory on the south side of the Gulf of Trieste and 12 miles SW. of the town of Trieste. It has two harbours, one an old castle, and manufactures of soap, glass, &c., with neighbouring salt-works. Pop. 9419.

PIRACALIS, See DÜREK.

Piramasen, a town of the Bavarian Palatinate, and formerly the chief town of the county of Hanau-Lichtenberg, 34 miles by rail W. of Landau.

The chief manufactures are shoes and musical instruments. Close by the Prussians under the Duke of Brunswick defeated the French commanded by Moreau on 14th September 1793. Pop. (1855) 14,938; (1895) 24,548.

Pirna, a town of Saxony, stands on the left bank of the Elbe, 11 miles by rail S. of Dresden. Here are a fine 16th-century church; a castle (1573) of the Duke of Saxony; a lunate archery-tower; manufactures of glass, chemicals, tobacco, stoves, &c. Eight thousand men are employed in the sandstone-quarries. Pop. 15,670.

PIROGUE, See PERAGUA.

Piroi, a town of Servia, on the Nisachova, 30 miles E.S.E. of Nisch. It was occupied by Servian troops in 1877, and taken by the Bulgarians in 1885. Pop. 8000.

Pisa, one of the oldest cities of Italy, the rival of Venice and Genoa, which still has its walls standing and a citadel, is situated on the Arno, by rail 49 miles W. of Florence and 13 NE. of Leghorn. It was formerly a great port, though six miles from the sea, but owing to the silt ing up of the river is now of commercial importance. Shrimp and salt-fish are exported, and there are manufactures of glass, chemicals, tobacco, stoves, &c. Eight thousand men are employed in the sandstone-quarries. Pop. 15,670.

PISTOIA, called also PORTO GRAQ, the harbour of both ancient and modern Athens (q. v.). Planned by Themistocles and laid out by Hippodamus of Miletus, the Piraeus is built in the glorious days of Pericles; this ruler and Cimon before him built the three ‘long walls’ that connected Athens with its port (5 miles to the south-west), and so ensured a free and safe passage from one to the other at all times. It was both a war harbour and a commercial port, many foreign vessels lived with it. In ancient (built 347-325 B.C.) and fortiﬁcations were destroyed by Sulla in 86 B.C., and from that time the town sank into decay. The modern Piraeus, which has grown up since 1834, is a regularly laid-out but mean-looking town, which contains grain-mills, arsenals, docks, and manufactures of cottons, ﬂour, paper, iron, nails, ears, furniture, &c., and is growing rapidly. A railway (1869), 5 miles long, connects it with Athens. The foreign trade (£4,000,000 annually) is half that of all Greece. The imports are mainly coal and railway plant, &c., from Britain; petroleum from the United States, and sheep and cattle from Russia; and the exports, tobacco, valonia, hides, bones, horns, cheese, wool, &c. A total of 6000 vessels of 21 million tons enter annually, one-half the tonnage being in Greek bottoms. Pop. (1871) 11,009; (1879) 21,655; (1890) 38,500.

Pirano, a seaport of Austria, on a promontory on the south side of the Gulf of Trieste and 12 miles SW. of the town of Trieste. It has two harbours, one an old castle, and manufactures of soap, glass, &c., with neighbouring salt-works. Pop. 9419.

Pirkheimer. See Dürek.

Pirmasens, a town of the Bavarian Palatinate, and formerly the chief town of the county of Hanau-Lichtenberg, 34 miles by rail W. of Landau. The chief manufactures are shoes and musical instruments. Close by the Prussians under the Duke of Brunswick defeated the French commanded by Moreau on 14th September 1793. Pop. (1855) 14,938; (1895) 24,548.

Pirna, a town of Saxony, stands on the left bank of the Elbe, 11 miles by rail S. of Dresden. Here are a fine 16th-century church; a castle (1573) of the Duke of Saxony; a lunate archery-tower; manufactures of glass, chemicals, tobacco, stoves, &c. Eight thousand men are employed in the sandstone-quarries. Pop. 15,670.

Piroguck. See Peragwa.

Piroi, a town of Servia, on the Nisachova, 30 miles E.S.E. of Nisch. It was occupied by Servian troops in 1877, and taken by the Bulgarians in 1885. Pop. 8000.

Pisa, one of the oldest cities of Italy, the rival of Venice and Genoa, which still has its walls standing and a citadel, is situated on the Arno, by rail 49 miles W. of Florence and 13 NE. of Leghorn. It was formerly a great port, though six miles from the sea, but owing to the silt ing up of the river is now of commercial importance. Shrimp and salt-fish are exported, and there are manufactures of glass, chemicals, tobacco, stoves, &c. Eight thousand men are employed in the sandstone-quarries. Pop. 15,670.
supports a dome, crowned with a cupola. The interior, noted for its wonderful echo, contains the grand and elaborate pulpit of Niccola Pisano (1260) and a large marble font. The beginning of the Campo Santo, or ancient national cemetery, was several loads of earth brought from Jerusalem towards 1200. In 1278-83 the ground was surrounded by cloisters by Giovanni Pisano, the walls of which were adorned with fresco-paintings by Orcagna, Benozzo Gozzoli, and others. The city contains

the pattern upon which the sea-laws of nearly all peoples navigating the Mediterranean were modelled. During the same century the Pisans repulsed the Saracens (1114). It was from 1202, attacked them in Africa, in 1090, and routed them utterly off Palermo in 1062. Early in the next century, in 1114-16, they wrested the Balearic Isles from the same enemies. In the second crusade too they played a prominent part, and helped the Turks against the Normans, taking Amalfi in 1135 and again in 1137. But already in the 11th century the rivalry between Pisa and Genoa had broken out. Florence too, a Guelph city, grew into an enemy of the Ghibelline Pisa. Wars many and often were waged between Pisa on the one side and a coalition of cities, headed by Florence and Genoa, on the other, with varying fortune, until in 1284 the Pisan fleet was crushed at Meloria. After this Pisa was compelled to give up Corsica, part of Sardinia, and 160,000 gold pieces to Genoa. At the same time Ugolino (q.v.) della Gherardesca made himself master of the town. Various individual rulers or tyrants followed, until the Pisans finally threw themselves (1399) under the protection of Galeazzo Visconti of Milan. The son of the latter sold the Pisan territory to the next powerful enemy, from whose tyrranical rule they were for a time relieved by Charles VIII. of France, who, in 1494, accepted the protectorate of the city. When the French left Italy the old struggle was renewed; and, after a desperate resistance, the Pisans, in 1560, were compelled by hunger and terror to yield to the Florentine army.

The most influential families, as formerly in 1406, emigrated. From this time Pisa steadily declined, until in the middle of the 18th century it had less than 8000 inhabitants. Its history henceforth coincides with that of Tuscany (q.v.). When the rest of Tuscany it became part of the kingdom of Italy in 1860.

The Council of Pisa met in Pisa on March 25, 1469, and of which the twenty-third and last session was held on 7th August following. Its aim was to end the schism which had divided the Western Church for thirty years, and with this view the leading cardinals, finding that neither of the rival popes, Gregory XII. and Benedict XIII., would keep their promises to abdicate, set aside the claims of both, and themselves convoked a general council which was attended by 24 cardinals, 4 patriarchs, 80 bishops, 102 prelates of bishops, 87 abbots, 200 delegates of abbots, besides many generals of orders, doctors, deputies of universities, and ambassadors. After the rival popes failed to appear in obedience to its summons, the council formally tried the claims of both in turn, and deposed them as schismatics and heretics. The cardinals then formed themselves into conclave and elected Cardinal Philargius, who assumed the name of Alexander V. But the council, instead of getting rid of the enmity and union of the continent in third, and the faithful continued to be distracted in their allegiance for eight years longer, down to the time of the Council of Constance. Bellarmine considers the Council of Pisa as 'neither clearly approved nor clearly rejected'; Hefele says 'neither ecclesiastical nor theological nor theological, nor the theologians have ever numbered it among the ecumenical councils.' See Hefele's Concilien-

Leaning Tower and Cathedral, Pisa.

numeros other churches, some of great age, dating from the 13th century and even earlier; also many fine palaces, private and official residences, including that of the archbishop. The university (1338) has a natural history museum, a botanical garden, a library (1742) of 120,000 volumes, and sixty lecturers and 600 students. The town possesses an academy of fine arts and archives. Amongst distinguished natives may be named the popes Eugenius III. and Nicholas V., the Visconti, Peter the Deacon, Leonardo the mathematician, Giovanni (but not Niccola) Pisano, and Galilei. The industrial activity is now confined to cottons, silks, ribbons, and the working of coral and alabaster. Dromedaries are bred at a royal farm in the neighbourhood. Pop. of commune (1891) 52,057; (1896) 64,700. The province has an area of 1180 sq. m. and (1896) a pop. of 311,742.

History.—Ancient Pisa, originally an Etruscan city, became subject to Rome in the 2d century B.C.; but, on the decline of the western empire, it was compelled to submit in turn to the nations who successively overran Northern Italy. Early in the 11th century Pisa had developed into a powerful republic, possessing a formidable fleet and extensive territories along the Tyrrhenian Sea; it yielded little more than nominal homage to its suzerain lords, the emperors of Germany. Throughout the 11th century Pisa was at the height of its prosperity; to this period belong most of the splendid monuments of art that still adorn the city. It had extensive commercial relations with the East; its 'customs of the sea' (1075) were
Piscataqua

His earliest work is supposed to be the 'Deposition' over one of the doors of the cathedral at Lucca, dated 1237. His reputation is supported by three important works, which are still admired for their excellence—the pulpit of the baptistery at Pisa (1260), the 'Area' or shrine of St Dominic for the village of Siena at (1267), and the pulpit of the cathedral at Siena (1268). He died at Pisa in 1278, and was buried in the Campo-Santo. He was also a great architect and a skilfulengineer. His influence on art was wide, reviving the love of beauty and giving new birth to the painting arts. Arnolfo and Lupo executed numerous works at Rome, Siena, and other cities. His son and heir in reputation, Giovanni Pisano (1250-1330), was not his equal either as sculptor or as architect. Niccolò's pupil Andrea Ponsello, generally called Andrea Pisano (1270-1349), was first a goldsmith, but became famous as a worker in natural bronze and a sculptor in marble. He settled in Florence, and his best work there (one of the baptistery doors and many sculptures on the Campanile) shows strong traces of Giotto's influence. Vitore Pisano, or Pisanello (1390-1455), was born from the younger generation, and the Croce and Cavalcaselle, Painting in Italy (1864); Symonds's Renaissance in Italy (1886); Leader Scott, Early Italian Sculptors (1882).

Piscataqua, a river which constitutes part of the boundary between Maine and New Hampshire, and forms at its mouth the excellent harbour of Portsmouth. See New Hampshire.

Pisciculture. Fish-culture is the art of increasing the supply of food-fishes—first, by breeding and rearing them artificially; secondly, by preserving the gravid fish and the natural spawning and nursery grounds through legislation; thirdly, by creating new breeding grounds through the removal of obstructions or the placing of fences, stakes, tiles, &c. for the collection of ova or of spat; lastly, by increasing the amount of natural food in any practicable manner. In recent years the artificial culture of sea-fish has been attempted on a large scale in several countries. In the United States and in Norway fully-equipped hatcheries for sea-fish and shellfish have been in operation for a number of years. In 1868 the Newfoundland government erected a marine hatchery at Dildo, Trinity Bay; and a similar establishment was completed in 1891 by the Canadian government near Placent, on the Northumberland Strait, Nova Scotia. In 1890 the Newfoundland hatchery turned out fifty thousand fish for seeding and sold to the value of hundreds of millions of young lobsters. In Britain the hatching of sea-fish has not yet been undertaken on a large scale; but very excellent experimental work has been done at Plymouth by Mr J. T. Cunningham, who succeeded in artificially fertilizing the eggs of herring and sole in the early part of 1890; at St Andrews by Professor M'Intosh; and by the Fishery Board for Scotland at Dunbar. Under the second head the Fishery Board for Scotland entered in 1883 on a scale experiment to ascertain what legislation, if any, was required to protect the inshore waters, either as spawning, nursery, or food-producing grounds, and several bylaws have been passed protecting the greater portion of the Scottish inshore waters. These provisions were extended by the Herring-fishery ('Scotland') Amendment Act, 1889.

Ponds for fresh-water fishes have been common from a very remote antiquity. It appears from Isaiah, xix. 10, that they were used in ancient Egypt. In the times of Roman luxury almost every wealthy citizen had fish-ponds. The Chinese have long bestowed more attention on pisciculture than any other nation, and with them it is truly a branch of economy, keeping up the supply of food, fish being used as much as meat by rich and poor at every meal. In China a large proportion of fish for the markets of the interior are reared in ponds. Some of these are generally placed in front of the villages, and many at large reservoirs. At the time of harvest they are caught and sent to market. Carp, perch, tench, and bream are some of the kinds kept in ponds. In some countries of modern Europe this branch of pisciculture is also prosecuted to a very considerable extent, particularly in Germany and Sweden, and of late years in France, in order to increase the supply of fish for the market. In Britain it has only recently been systematically prosecuted. The country-seats of the nobility and gentry have, indeed, been generally provided with fish-ponds, but in most instances rather as ornamental waters than for use. In the northern provinces of Britain, the trout, perch, and pike are almost the only fish kept in ponds; in England they are often stocked with carp and tench, and are turned to much better account than in Scotland. In Germany ponds are carelessly stocked, and are used merely for sport and remunerative. There can be no doubt that in Britain also many a piece of land at present very worthless might easily be converted into a pond, and made to yield large quantities of excellent fish.

The greatest improvement in pisciculture, and a most important branch of it, to which the term is often restricted, is the breeding of fish in artificial breeding-places, from which not only ponds but rivers may be stocked; or the art of fecundating and hatching fish-eggs, and feeding and protecting the young animals till they are of an age to secure their own food and protect themselves from their numerous enemies.

In the middle ages, and especially in the 14th century, fish-ponds were common in the domains of princes and nobles and religious communities; but those were mere ornamental ponds, and the first attempt at artificial fertilisation of fish eggs appears to have been made at the beginning of the 15th century, by Dom Pinchon, a French monk; but his experiments attracted no attention. Between 1725 and 1735 Stephan Ludwig Jacobi of Hohenrettau in Bavaria, who was professor of chemistry, but who was entirely independent of the official; but commercial pisciculture owes its origin to the French, the art having been first practised by Réuy, a poor fisherman who worked the streams of La Bresse in the Vosges. It was the great waste of eggs incidental to the natural system of fish-breeding that led Réuy about 1830 in conjunction with a partner, Géhin, to try to reduce the fish-streams of his native district. His plan, being successful, attracted the notice of many of the French savants, and led to preference for Réuy; the nobility was keen to adopt the plan, and the government. At Hünningen in Alsace, on the Rhine, a gigantic fish-nursery and egg-depot was erected in 1802, chiefly through the energy of M. Coste. Since the cession of Alsace to Germany the operations of the establishment at Hünningen have been conducted on a still larger scale by a German association.

Réuy and Géhin's plan of rearing trout artificially is this: At the time the female is about to spawn she is caught and gently pressed on the abdomen by the hand, when the ova or eggs spurt forth into a vessel containing water. In the same way the milt is taken from the male. The eggs
are well mixed with the milt, and the water changed once or twice. The fecundation being completed, the next thing is to place the eggs for security into a covered vessel. Its early form was that of a flat, round box about eight inches in diameter, with a hinged lid. This was made of zinc, perforated with small holes, and had a layer of fine gravel on the bottom. A considerable number of fecundated eggs were enclosed in the box, which was then placed in the bed of a current of pure water and covered with pebbles, care being taken that the water passed freely through, as it is necessary for the eggs to be slightly agitated. The hatching takes place in from two to four months, the time depending on the nature of the water and other circumstances. For a description of the early changes which the fish undergoes, see Salmon.

After the little fish are fully formed they are kept in the box from eight to fifteen days, and then set at liberty. The later plans for artificially propagating trout or salmon differ principally in mixing the milt and milt in an absolutely dry utensil and in the details of the hatching-boxes, in the use of houses, and in many of the young fry being kept in ponds till they are a year or more old.

The most sustained effort in British pisciculture has been in connection with the salmon fisheries of the river Tay. At Stornonvole, near Perth, since 1833, a series of open-air hatching-boxes, covered with gravel and capable of receiving 50,000 eggs, have been in use; but for years nothing like this number have been hatched, and probably not 20,000 young fish annually have for some time past been turned out of the ponds there. The Tay District Fishery Board in 1883 erected a new hatchery a few miles away at Dupplin on the Earn. It was put up to try the system of glass grill hatching-boxes, designed prior to 1860 by M. Coate of Paris, and presently to be described as in use at Howietoun. On this plan it was estimated to hatch 300,000 ova. But in the autumn of 1883 the Board decided to adopt only partially the grill hatching, and to try along with it the simpler Canadian system of shallow trays of perforated tin-plate, and coated with Japan varnish; in which the eggs, instead of being in separate rows, are packed very closely together, river-water being used. In 1889 it was stated to be capable of hatching four or five hundred thousand fish.

The most extensive fish-rearing establishment in Great Britain is the one belonging to Sir James Maitland, situated at Howietoun, near Stirling. It consists of hatching-houses and, at a distance from them of half a mile, an extensive series of ponds. The principal hatchery is 86 feet long by 40 feet wide, each of its two stories being 10 feet high. Its walls, built of brick and concrete, are nearly 2 feet thick; and the roof is covered with a layer of concrete 3 inches thick, over which there is a thin cover of asphalt. The entire outer shell is thus a bad conductor of heat, so that it is not difficult to keep the water inside from falling below 44° F. Fig. 2 gives a sectional view of the hatchery. It will be seen that each floor has a considerable slope, which admits of the hatching or grill boxes (Fig. 2) being placed in descending series. These are 154 in number, the ordinary size of them being 6 feet 9 inches long, by 1 foot 7 inches broad. In the bottom of each box four wooden frames are neatly fitted, each of which has rather more than 100 glass tubes, about \( \frac{1}{4} \) inch in diameter, placed transversely. Fig. 1 shows a longitudinal section of one of these hatching-boxes, in which the dotted line indicates the position of the glass tubes. Upon these glass grills the fish-eggs lie in parallel rows, looking like small pink beads. Six cisterns or tanks \( \{b, b, b\} \), each 20 feet long and five feet broad, are fitted up in the lower portion of the ground-floor to receive the young fry after they begin to take food. At Howietoun both hatching-boxes and rearing-tanks are constructed of wood charred on the internal surfaces, and painted on the outside, their ends being formed of perforated zinc, which is closed with flannel when any depth of water is required in the tanks. At other hatcheries, however, the tanks and boxes are formed of slate, and sometimes of earthenware, but in such cases they are of smaller size. Often, too, the eggs are placed on perforated zinc or porous earthenware instead of glass grills. While the eggs are being hatched only spring water is used. It is brought underground to the two cisterns \( \{c, c\} \), and from these it is conveyed by lead pipes \( \{p, p, p, p\} \) to each series of hatching-boxes, over the grills of which it flows in a constant but not rapid stream. Each of the hatching-boxes contains about 15,000 eggs, but in the earlier part of the hatching-season (December) eggs are also placed in the 20-feet tanks, so that about four millions of
fish-eggs can be brought to maturity in one season. In 1890-91, 2,310,000 eggs were incubated, 81,500 yearling trout sold and 40,000 yearling trout retained, to grow into two-year-olds, and 19,000 two-year-old trout sold and 6,000 retained.

The ponds at Howtown are extensive and ingrown with reeds for reasons of convenience. Water is supplied to them by a barn issuing from Loch Conter, a lake of considerable size, and largely fed by springs. They are divided into a larger and a smaller group. The former consists of ten ponds, of which the largest measures 290 feet in length by 90 feet in breadth, and 12 feet deep. Next to this is a sub-group of three ponds lying parallel to each other, each 270 feet by 45 feet, and 10 feet deep. These also contain Lochleven trout of different ages, and about 5000 in number in each pond. The remaining twenty-five ponds are each about 100 feet long, and contain respectively American brook trout (Salmo fontinalis), yellow trout (Salmo fario), and more Lochleven trout under three years of age. Their various levels are so arranged that by means of open tracts and dividing-boxes the water is slowly but constantly filtered through the water and best in the series, and sluices are provided so that any single one can be emptied when required. Each pond is also provided with a cleansing pipe.

At Howtown the young fry are fed chiefly on grated eggs and beefsteaks made up into strings like macaroni. The strings and worms are mixed on minced horse-flesh, and older trout on shellfish. But some pisciculturists strongly recommend that additional kinds of food, such as boiled liver, chopped worms, fish-roe, and biscuit-dust, should be given in turns to fry. A large proportion of trout-diet—many, as some experimenters and persons think, of starvation—during their first year, even when kept in ponds regularly supplied with food. The strong repel and devour the weak at feeding-time, but the mortality, in so far as it may be caused by food at all, is probably more due to the kind used, or to the form in which it is given. In the case of rearing-ponds situated near the sea, mussels and shrimps are much used for feeding purposes. At Guildford, Surrey, the trout are allowed to find their own food, but with this system the ponds must be large in proportion to the number of fish contained in them, as well as favourably situated with respect to a sufficiency of natural food. Near St. Viten, Lower Austria, this plan is adopted. There are a number of small ponds or ditches with stagnant water and aquatic plants, which are used as nurseries to propagate the larvae of insects, small crustaceans, and other low forms of animal life on which trout naturally feed. From time to time part of the water swarming with these creatures is admitted to adjoining ponds with pure water in which the fish live. It probably depends on the locality of the particular method of feeding succeeds best in a commercial sense.

In Great Britain it is as yet only members of the Salmonidae family which have been artificially reared on a commercial scale. But quite recently some attention has been given to the cultivation of white trout (Coregonus albus), in which 21,800,000 fry were raised by five members of the Perdie family, besides smaller numbers of other species, making a total of 67,000,000. The common or Atlantic salmon has been introduced into Tasmania, and seems now to be thoroughly acclimatised, numbers of adult fish, besides shoals of the young, occurring in the rivers. One or more species of British trout have also become established in Tasmanian as well as in Australia and New Zealand rivers. At Otago, there is a trout-hatchery. In Victoria the Californian salmon has been found to succeed better than the American white, as it is more adapted for the climate, and the water is not so great. They have all, more or less, a comparatively insipid taste, but this could no doubt be improved by proper attention to their food. Pike being great cannibals, there is more difficulty in stockling ponds with them, even when there is not much difference in their size, than with most other fish. Perch—which have an extraordinary power of increase—spawn readily in confinement, but it is said that the fry are not very easily reared. In America persevering efforts are being made to acclimatisé the mirror carp, which is a favourite fish for the table in Germany. See Pike, and Carp.

Pisciculture is practised in America on a very large scale. The United States Fish Commission have several stations for hatchling eggs of the Salmoideæ, the largest being on the M'Leod River, California, established for the ovum of the California salmon (Salmo clarki). The California commissioner, Professor Spencer Baird, gives the total production: of eggs at this station for the season of 1879 as about 9,500,000; but the number for 1878 was 14,000,000. In 1879, 2,900,000 were hatched at the station to keep up the stock in the Sacramento River, 4,150,000 were taken to the eastern states, and the remainder were sent to Canada, France, Germany, and Holland. The Californian salmon can adapt itself better than the common species to comparatively warm water, so that it will thrive in some rivers where the latter will not; but whether it will prove equally well adapted to the colder waters of Europe is still a matter of uncertainty. This station is now chiefly used for hatching the rainbow trout (Salmo irideus), 28,700 fry being planted in the M'Leod River in 1885. There is another hatching-station at Buckport, Maine, for the Atlantic salmon (Salmo salar), and one for the Grand Lake Stream, Maine, for breeding the Schoodic or landlocked salmon, which is a variety of the Salmo salar. In the United States there are several hatcheries for the propagation of shad, the aggregate yield of which in 1884 was 9,600,000. The hatchery at the station at Caledonia, in that state, has distributed 18,000,000 trout, salmon-trout, carp, pike, and muscalongue in one year. Hatching-stations for the cod and other sea-fish are also being tried. For oyster-culture, see OYSTER.
PISCINA

Francis (1865), Fry (New York, 1896), Goode (in the Trans. Amer. Fish-culture Assoc., New York, 1881), Gorlick (24 ed., Cleveland, Ohio, 1893), Green (on trout, Rochester, N.Y., 1870), Gwy (on stocking, 1884), Jacobson (from a Report of the U.S. Commission, 1880), Sir James Maclead (a history of Howlett, 1887), Giffen (on salmon at the Antipodes, Philadelphia, 1885; Lond. 1889), Roosevelt (Rochester, N.Y., 1879), Slack (on trout, New York, 1872), Stone (on trout, Charleston, 1877), Wilmot (on Canadian fish-culture, Ontario, 1882), Wilson (on salmon at the Antipodes, 1879). Also French works by Coste (1850 and 1858), Géhin and Rémy (1851), Lamiral (1851), Lamé (1860), Millet (1870), Quatrefages (1854), Bavaret Wotté (1874 and 1878), Rémy (1854 and 1856), De Bon (1880); Gobin, *La Pisciculture en Eaux Douces* (1889), *La Pisciculture en Eaux Saltées* (1891); and German works by Max von dem Borne (1879), Haack (1872), and Jacobi (in the *Hauussischeer Magazin* for 1763—believed to be the earliest printed notice of modern fish-culture), Nicklas (1880), Vogt (1875), Benecke, Dalmer, and Von dem Borne (1886); also the annual Bulletins and Reports of the United States Fish Commission, and the Bulletins de la Société d'Acclimatation de France.

Piscina (named from the swimming-pond in the old Roman baths), in Catholic churches, a shallow stone basin with a drain leading directly to the earth, into which the priest washes his hands, and rinses the chalice at the end of the celebration of mass. In England it is almost invariably placed on the south side of the choir, at a convenient height.

Piscis, a walled town of Bohemia, stands on an alluvial of the Moldan, 84 miles by rail S. by W. of Prague, and has iron and brass works, and manufactures of paper, boots, hats, &c. Pop. 10,596.

Plisia, a name that seems to have applied generally to the mountains immediately to the east of the Lower Jordan, identical with, or closely allied to, a part of the mountains of Asamir (Deut. xxxii. 49; xxxiv. 1), one of the summits of which is Mount Nebo (the modern Neba), 2644 feet above the level of the Mediterranean. From this point Moses enjoyed his glimpse of the Promised Land, in early spring. It is not the highest point among the spurs which here run out from the Moabite plateau, but Major Conder points out that it is the nearest ridge to the Israelite camp in the plain of Shittim. He describes the way to the east as shut in but two miles off by the side of the Moabite plateau, and to the south as closed five miles off by a long ridge, but that to the west as including all the Judean watershed, and in clear weather all Samaria and Lower Galilee. The Tiberias and the coast of Gilboa The Sea of Galilee and Hermon are shut out by the lofty range of Pentiel (Jebel Oskh’i) in Gilead, while the western watershed of Judea and Samaria makes it impossible to see the waters of the Mediterranean; but below to the south-west the northern half of the Dead Sea is seen, between the two branches of Engedi, beyond which stretches the dreary desert of Judah. The burial-place of Moses is unknown, but may have been, suggests Conder, in the terrible gorge of the Zerka M’ain, on the south side of the cliff of Peor, or Minyeh, the Callilhoe of the tyrant Herod’s days. Its old Hebrew name appears to have been Nehaliel (‘the valley of God’).

Of the three tribulations from which Bahamid watched the encampment of Israel, Conder makes the first Banath-Baal (Masbubiyekh), a high ridge separated from Nebo by a deep valley; the second, the ridge of Nebo itself; the third, the top of Peor, over against Jeshimon, a cliff called Minyeh.

Pishin, a district of Southern Afghanistan, just north of Quetta, which has been governed by a political agent of the Governor-general of India since 1878. The British occupied it on account of its great strategical importance; it is the meeting-place of several roads, practicable for troops but not for wheeled carriages, leading from Sind and Punjab to Kandahar. The district—area, 300 sq. m.; elevation, 5000 feet—consists of alluvial valleys separated by ranges of hills, the whole sloping south-west, and surrounded by mountain-chains that reach in north and south 11,000 feet. The people, partly settled, partly nomad, grow wheat, barley, rice, grain, milk, honey, water-melons, and musk-melons, and trade in horses to India. Pop. 60,000. A branch of the Indus valley line traverses the principal valley.

Pisidia, one of the ancient divisions of Asia Minor, lay on the south, separated from the sea by the narrow strip of Pamphylia, and having Phrygia on the north, Isauria on the east, and Lycia on the south-west. Traversed by the main chain of the Taurus, it is a mountainous region, with an insup- pitable climate. The people, a race of hardy and lawless mountaineers, were greatly given to predatory expeditions, and do not seem to have paid any regular obedience to the various oriental and other conquering races up to the Roman period. In the Roman supremacy there were several prosperous cities, as Sagalassus, Antioch, Sele, Ternussen. The boundaries of the province varied at different periods.

Pisistratus (Gr. *Pisistratos*), a famoustron of Athens, was born about 600 B.C. At first he co-operated with his kinsman, the famous Solon, and in the war against the Megarians acquired considerable military distinction; but afterwards, when probably his ambitious views had become more matured, he came forward as the leader of one of the three parties into which Attica was then divided—the *Demose* (population the islands), chiefly a labouring population, jealous of the rich, and enger for equality of political privileges. Driving into the market-place of Athens one day, and exhibiting certain self-inflicted wounds, he called upon the people to protect him against his and their enemies; and, a general assembly of the citizens being summoned, a partisan proposed to allow him a bodyguard of fifty men. The measure was carried in spite of the strenuous opposition of Solon. Gradually Pisistratus increased the number, and in 500 B.C., when the Philistines had conquered the Acropolis. The citizens, in general, seem to have tacitly sanctioned this high-handed act. Megacles and the Aleonomidae—the heads of the rich aristocratic party—fled from the city, but returned in 554 and drove Pisistratus into exile in Elbe (552). Supported by Thibes and Argos, he was able in 541 to sail with a strong force, landed in Attica at Marathon, and marched on the capital. His partisans hurried to swell his ranks. At Pallas he encountered his opponents, and completely defeated them, but used his vic- tory with admirable moderation. When he entered the city no further resistance was made, and he resumed the sovereignty at once. He lived for sixteen years afterwards in undisturbed possess- sions of power, dying 527 B.C., and transmitting his
supremacy to his sons, Hipparis and Hipparchus, known as the Pisistratidae. Although the precautionary measures he adopted to establish his authority involved at first a resolute and stringent policy, yet no sooner had he placed himself out of danger than he began to display that wonderful tact, moderation, and sympathetic appreciation of the wishes of the Athenians that have won him the praise of all later writers. Firmly, and not harshly, enforced obedience to the laws of Solon; emptied the city of its poorest citizens, and made them agriculturists, supplying such as had no resources with cattle and seed; secured provisions for old and disabled soldiers; bestowed greater care and solicitude of the religious festivity of the Atticans; encouraged literature more than any Athenian had ever done before—it is to Pisistratus, or to the poets, scholars, and priests about him, that we owe, for example, the first complete edition of Homer; and, like his still more brilliant successor in the following century, Ptolemy, he adorned Athens with many of its most beautiful buildings, such as the Lyceum, temples to the Pythian Apollo and the Olympic Zeus, &c. See works on Pisistratus by Flach (1885) and Töpffer (1886).

Pisolite (Gr. 'pea-stone'), a concretionary limestone, differing from oolite in having the particles as large as peas.

Pistacia, a genus of trees of the natural order Anacardiaceae, having handsome flowers without petals, and a dry drupe with a bony stone. The Pistacia or Pistachio tree (P. vera) is a small tree of about 20 feet high, a native of Persia and Syria, but now cultivated in all the parts of the south of Europe and north of Africa, and in many places naturalised. It has alternate leaves, with about two pair of oval leaflets, and an odd one, flowers in racemes, fruit ovate, and about the size of an olive. The stone or nut splits into two valves when ripe; the kernel, which is of a bright green colour, is very oleaginous, of a delicate flavour, and in its properties resembles more in the natives of sweet almonds. In the south of Europe and in the East Pistachio Nuts are much esteemed; but as they very readily become rancid they are little exported to other countries. They are sometimes called Green Almonds. Oil is expressed from them for culinary and medicinal purposes. If the male tree is allowed to five or six fertile ones. The tree produces flowers and even fruit readily enough in the south of England but the summers are not warm enough to ripen the fruit, and the tree is apt to be destroyed by a severe frost. The Mastictree, or Lentisk (P. lentiscus), yields the gum-resin called Mastic (q.v.). It is a native of the countries around the Mediterranean. The Turpentine-tree (P. terebinthus) yields the Turpentine (q.v.), known in commerce as Cyprus Turpentine, Chian Turpentine, or Sea Turpentine, which is of a consistency somewhat like that of wax. A gummy resin, flowcolour, an agreeable odour, and a mild taste, and in its properties resembles the turpentine of the Confiers, but is free from acidity. It is obtained by making incisions in the trees, and placing stones for the turpentine to flow upon, from which it is scraped in the morning, before it is liquefied again by the heat of the sun. The tree is about 30 or 35 feet in height, and has pineate leaves, of about three pair of leaflets and an odd one, the flowers in compound racemes, the fruit nearly globular. The kernel of the fruit is maganous and pleasant. The Batoum Tree (P. atlantica), a round-headed tree about 40 feet in height, a native of the north of Africa, produces a fruit much used by the Arabs; and a gum-resin of pleasant aromatic smell and agreeable taste, which exudes from its stem and branches, is chewed to clean the teeth and impart a pleasant smell to the breath. The fragrant oil of the kernels of P. ocyanus, so identified with the Chian of Cochin-China, is used there to perfume ointments.

Pistil, that part of the Flower (q.v.) which, after flowering is over, is developed into the fruit. See FRUIT.

Pistoia (anc. Pistoria), a town of Italy, stands 21 miles by rail NW. of Florence, on a spur of the Apennines. Its streets are thoroughly Tuscany, and it is surrounded with walls, pierced by five gates, and has a citadel. The chief buildings are the cathedral of San Jacopo (12th and 13th centuries), containing a magnificent altar of silver (1280-1405) and several good pictures; the church of St Bartholomew, with a fine white marble pulpit by Guido di Cémoro; and St Andrea, with Giovanni Pisano's pulpit (1291); St John, with a font by Giovanni Pisano and terra-cottas by Andrea della Robbia; the 14th-century communal palace, and other palaces. The principal manufactures are iron and steel wares, agricultural implements, paper, oil, and silk. But the town has the credit of having invented fireworks. The town was given them its name in the form pista. Here Catiline was defeated in 62 B.C. The town was conquered by Florence and Lucca in 1306. Pop. 21,500.

Pistol is the smallest description of Firearms (q.v.). See also REVOLVER.

Pistole, a gold coin formerly current in Spain and France. It is said to have been current to about eleven old French livres, though till about 1730 it was merely an irregular piece of gold. Its value varied somewhat at different times and in different countries, usually being between fifteen and sixteen shillings. The gold pistoles once current in parts of Germany were in most cases merely convenient multiples of the ordinary thaler and golden. The Louis d'or was intended to take in France the same place as the pistole in Spain.

Pita-hemp, one of the names of the Agave fibre. See Fibrous Substances.

Pitaka, a division of the Buddhists' sacred literature; the tripitaka meaning the three great divisions of their canonical works, the Abhidharma, the Vinaya, or Discipline, and Sutta (aphorisms in prose), and collectively, therefore, the whole Buddhist code.

Pit and Gallows, a rendering of the grant of capital jurisdiction (eun usus et foro) made to vassals by the crown in feudal times. Malefactors were usually hanged on the gallows (foro); women were hanged in a ditch or well (foeso). See Baron, Drowning.

Pitaval, François Gayot de (1673–1743), compiler of the famous collection of Causes Célèbres (q.v.), served in the army, but became an advocate, and was known as an industrious and painstaking compiler. Of his great work there have been numerous abridgments, continuations, and translations; and his name has become consfused with the collecting of criminal cases that a similar work, published by various editors in Leipzig in 1843 and succeeding years, was called Der Neue Pitaval (2d ed. 36 vols. 1857–72; new series, 1866 et seq.).

Pitcairn, Robert (1792–1855), editor of the invaluable collection of Criminal Trials in Scotland from 1750 to 1824 (4 vols. 1850). He was joint clerk and post in the Register House at Edinburgh. He was an active member of the Bannatyne Club, and secretary of the Calvin Translation Society (founded 1843).

Pitcairne, Archibald, physician and satirist, was born at Edinburgh, 25th December 1632. He studied first theology and then law at the univer-
sity of his native city; but having gone to France in ill-health, made final choice of medicine as his life study, completing a distinguished course at Paris. He practised with success in Edinburgh till 1892, when the fame of his treatise on Harvey's discovery of the circulation of the blood secured him a call to Leyden as professor. Here he remained only a short while, lecturing on his celebrated work published as Elementa Medicae Physico-Mathematica (1718). He returned to Edinburgh to become one of the most famous physicians of his time: producing also Dissertationes Medicas (1701). For he was even more notorious as a Jacobite, an Episcopalian, a satirist, than for the medical things, and, according to his opponents, as an atheist and sceptic at religion. The Assembly is a comedy in ridiculing of the General Assembly of the kirk; and Babel, or the Assembly (1692), is a poem with the same aim. His Latin verses, some of which were republished by Ruddiman in 1725, are creditable. He died 20th October 1713.

Pitcairn Island, a solitary island in the Pacific Ocean, between Australia and South America, in 25° 3′ S. lat. and 130° 8′ W. long., measures 23 miles by 1 mile. It was discovered by Carteret in 1767, and at that time uninhabited, a fact unimpeachable, though it is certain that there had been inhabited at one time. In 1768 it was taken possession of by nine of the mutineers of H.M.S. Bounty (see Bligh), with six Tahitian men and a dozen women, the ring-leader being called Christian. Four years later the native men one was murdered and all the women were exterminated by Alexander Smith, who afterwards assumed the name of John Adams. Thereupon the women, in revenge, murdered all the Tahitian men. According to another account, the white men and the Tahitians made war on each other; the Tahitians killed only two Englishmen and left alive. Certainly it is that at the end of ten years John Adams was left alone, with eight or nine women and several children; and from them the present inhabitants (126 in 1890) are descended. Adams, changed by these tragic adventures, and sobered by his responsibilities, set about the education of his companions in Christian principles. The little colony was unknown to the world until 1808, when it was 'discovered' by Captain Folger of the American sealing ship Topaz; the first British vessel to visit it did not arrive until 1814. The British were visited again in 1825 and 1830, and in 1831, as their numbers had rapidly increased (to 87), they were at their own request removed to Tahiti by the British government. But, disgruntled by the immorality and other undesirable customs of their Tahitian relatives, the most of them came back to Pitcairn Island after about nine months, in a vessel chartered by themselves. The island was annexed to Britain in 1839. Nearly 200 of the islanders were transferred to Norfolk Island in 1856, but a number of others returned. Pitcairn Island enjoys a lovely climate; its mountainous surface reaches 1008 feet in Outlook Ridge; the soil is fertile, and produces yams, cocoyams, sweet potatoes, bananas, &c. The people are degenerating, from intermarriage and their being almost inarticulate. The chief occupations are fishing and whaling.

See Sir J. Barrow, Motions of the Bounty (1831); Lady Belcher, Mutineers of the Bounty (1750); T. B. Murray, Pitcairn Island (1854; new ed. 1885); Ross Amelia Young (a native), The Story of Pitcairn Island (1890).

Pitch, the degree of acuteness of musical sounds. A musical sound is produced by a series of vibrations recurring on the ear at precisely equal intervals, the greater the number of vibrations in a given time the more acute or higher is the pitch (see SOUND). The pitch of musical instruments is adjusted by means of a tuning-fork, consisting of two prongs springing out of a handle, to make the vibrations of a given air more or less uniform (C = 498 to 515 vibrations per second); but since then, owing mainly to the aid of wind-instrument makers to obtain greater brilliance of tone, it has constantly been rising, to the detriment of other sounds. Nearly all modern orchestras have adopted a uniform (C = 531) as the standard. In 1891 the American piano-manufacturers agreed to adopt French pitch. An effort towards uniformity of pitch in Great Britain, made in 1859-69 by the Society of Arts, and a subsequent attempt initiated by the Royal Academy of Music in 1885, had no practical result. Most British orchestras continue to play at the higher pitch known as Parisian pitch, while in music not orchestral, and with vocalists generally, a pitch about the French is used. The main obstacle to the lowering of pitch is the expense of new wind-instruments, it being impossible to lower the old ones so to great an extent. See A. J. Ellis, History of Musical Pitch, reprinted from the Journal of the Society of Arts, 1880, and given in abstract in Nature, vol. xxi.

Pitcher-plant. See Insectivorous Plants.
PITCH

Pithecëus (Gr., 'ape'), a name formerly used by zoologists for various groups of apes and monkeys. See SAKL.

Pithom, one of the store-cities of the children of Israel built for Pharaoh (Exod. i. 11), concluded from the conclusion of M. Naville with the deserted Arabic village Tell El-Maskhuta, on the Fresh-water Canal and railway line from Cairo to Ismailia, about half-way between Ismailia and Tell El-Kebir. See Naville's Store City of Pithom (1883).

Pitman, Sir Isaac, founder of the Pitman system of Shorthand (q.v.), who was knighted in 1894, was born at Trowbridge, Wilts., 4th January 1813. His father, a factory overseer and afterwards cloth manufacturer, was superintendent of the poet Crabbe's Sunday-school. Young Pitman, a studious and religiously disposed youth, was for a time a clerk, and after some preliminary training taught a school at Barton-on-Humber (1832-36) and at Wotton-under-Edge, where he turned his attention to the popularising of shorthand, and issued through Bagster his Stenographic Sound Hand (1837). Copies of his second edition were put into circulation simultaneously with the introduction of the penny post in 1840. Dissuised from Wotton and Bicester (the scene of his early popularising of the Church, he conducted a school at Bath (1839-43). Henceforward his career is the history of the development of shorthand and spelling reform. He wrote, travelled, and lectured in its interest, his working day commonly lasting from 6 A.M. till 10 P.M., and away at the same time for meals and relaxation. In 1842 he brought out the Phyenic Journal, with which the late A. J. Ellis was for a time associated. In 1845 premises were opened in London for the sale of Pitman's publications. In recognition of his exertions he was presented with £250 and a marble timepiece in 1882, and at a phonographic jubilee meeting in 1887 was presented with a marble bust of himself. He died 22d January 1897. In his early days he spent much of his narrow income in the cause. Up till 1890 he had issued from his Phyenic Institute, South, London, his shorthand Phonographic Teacher was selling at the rate of 150,000 annually. From the date of issue 1,370,000 had been sold. There were also eighty-four shorthand associations, and a National Phonographic Society, whilst the subject had been recognised in the Education Code (1890) and the Technical Instruction Act of 1889, so that Pitman's labours of more than half a century have been crowned with success. About 95 per cent. of reporters in England, the colonies, and America use Pitman's system, which has been adapted to the Welsh, French, German, Italian, Spanish, Dutch, Japanese, and Malayasian languages. It is estimated that its practitioners all over the world number above half a million. See T. A. Reed's Biography of Isaac Pitman (1890).

Pitron Bark. See CARIBBER BANK.

Pitrat, Jean Baptiste, was born at Champforsqel, near Autun, August 31, 1812, entered the order of St Benedict, and devoted himself to historical studies in the abbey of Solesmes. In 1888 he was sent by the pope to Russia to study the Slavonic liturgy, was created a cardinal-priest in March 1863, librarian of the Vatican in 1869, and Cardinal-bishop of Frascati in 1879. He died February 3, 1889. His works include Histoire du Sacre de Jésus (1842), Procédé de la Nature, vol. ii, iii., liii, lii., and in the present work the articles ANTHROPOID APES, MAN, SKULL.

PITRA

Pich Lake. See TRINIDAD.

Pitchstone, or Retinite, an acid volcanic glass, dark green, reddish brown, yellow, dark blue, or black, and occasionally showing a streaked or clouded appearance. It has a pitch-like or greasy lustre, and a very conchoidal fracture, and is translucent on thin edges. It is usually rich in microโรites, and often contains crystalline granules and crystals of felspar, pyroxene, hornblende, biotite, and quartz. Now and again it shows pellite and spherulitic structures. When composed of sandstone it is mantled with sand, and abundantly present in the rock it is termed Pitchstone Porphyry. It occurs in the form of dykes and also as lava-flows. The name pitchstone has sometimes been given to the darker varieties of meiolite, a form of opal.

Pith, or MEDULLA, is the central cylinder of tissue in the stems of Dicotyledons and Gymnosperms. In all plants where it is found it is continuous in the young state. In older plants it may be continuous, as in the elder, oak, &c., in the form of transverse discs, as in the walnut, or wanting in the internodes, as in hemlock, &c. In very young stems it is composed of small cells filled with protoplasm and cell-sap, and takes part in the conduction of nutritive substances throughout the plant. The cell-walls usually remain very thin, the protoplasm is soon all used up within the cells, and their further growth ceases. Examined microscopically, pith cells are usually polygonal in transverse section, while they are rectangular in longitudinal section, and not much longer than broad. The ring of wood immediately surrounding the pith consists largely of spiral and annular vessels, and is known as the medullary sheath. The pith is connected with the cortex and bast by the medullary rays, which are composed of cells similar to those of the pith, and which convey sap to the inner parts of the stem. In the early life of most trees the pith serves as a storehouse for starch and other reserve substances; but as the tree increases in age the inner wood is invaded by wood, communication with the cortex and bast is physiologically obstructed, and the pith cells become dry and full of air.

Pithecanthropus erectus ('erect ape-man'), the name given by Dr Eugene Dubois, of the Dutch army medical service, to the animal remains which he discovered on the shore of Java. These consist of the upper part of a cranium, a left femur, and two molar teeth, and were found in 1891-2 on the left bank of the Bengawan river, near Trinil, during explorations conducted for the government of the Dutch Indies. The cranium and teeth were found close together, and the femur a few yards away and a year afterwards; but Dr Dubois believes them to belong to the same skeleton, and to such as could only have belonged to an animal midway between man and the higher apes, and of pleistocene age. The cranium is in length and size between the normal human and the gorilla's skull, and rather closely resembles that of a microcephalous idiot. The find has given rise to much discussion and difference of opinion; many authorities holding that the femur and cranium have not been proved to belong to the same skeleton, and the while the femur is undoubtedly human, the cranium is of a very low human type; others wholly or partly agree with Dr Dubois. The diversity of opinion extends to the teeth, which are large and powerful.

See the discoverer's monograph, Pithecanthropus erectus (Batavia, 1891), in German; the paper read by Dr Dubois to the Royal Dutch Institute, for the Advancement of Natural Science, vol. ii, iii., liii, liii., and in the present work the articles ANTHROPOID APES, MAN, SKULL.
Pitt, William, ‘the younger,’ son of the great Earl of Chatham and of Lady Hester Grenville, was born at Hayes, near Bromley, in Kent, on 28th May 1759. At the time of his birth his father was still in the House of Commons and in the very zenith of his fame, and the future statesman grew up amid admiring and anointing. He was well fitted to foster that political ambition which was to be the guiding and almost the sole impulse of his life. His constitution in boyhood seemed very weak; he was never sent to school, but his education advanced self-motivated and under a father’s eye, and by the age of fourteen he was able to enter Cambridge when only fourteen.

He was then a shy, reserved boy of exceedingly precocious talents, of irreproachable morals, and of regular and studious habits, little drawn to college societies and amusements, and already distinguished by a rare self-control and concentration of purpose. From his earliest youth political life was placed before him as his ideal, and all his studies converged to that end. He became an excellent classical scholar, but he valued the classical writers mainly as a school of language and of taste; and it was observed more particularly in his youth than later that he had a peculiar facility in the styles, noted down every just or forcible expression, and compared the opposite speeches on the same subject, observing how each speaker met or evaded the arguments of his opponent. Like many others he found in Locke a great master of clear and accurate thinking. His father supervised his studies with much care, and it was remembered that he specially recommended to him the sermons of Barrow as models of style and reasoning, and the histories of Polybius and Thucydides as fountains of political wisdom; that he got him a collection by making him declaim the grandest poetry in Shakespeare and the speeches of the fallen angels in the Paradise Lost; and that he exercised him in fluency by accustoming him to translate into flowing English long passages from the classical writers. To this last impartation Pitte largely ascribed that amazing command of choice and accurate English in which he surpassed all his contemporaries.

When little more than a boy he was an attentive and discriminating listener to the debates in Parliament. He became thoroughly familiar with political and philosophical questions, and together with his brother-in-law, Lord Mahon, he supported his father into the House of Lords on the 7th April 1778 on that memorable occasion when Chatham delivered his last speech against the surrender of America, and that oration which was his crowning stroke. Pitt left with a patrimony of less than £300 a year. He was called to the bar in the June of 1780, and went on the Western Circuit, but in September parliament was dissolved, and he at once threw himself into politics. He stood for Cambridge University, but found himself at the bottom of the poll; but Sir James Lowther gave him a seat for his pocket borough of Appleby, and Pitt, in opposition to the ministry, entered the House of Commons on 23rd January 1781.

He came into the House bearing a name which was beyond all others revered by Englishmen, with the advantage of being in no way mixed up with the calamitous American war, and with talents that had already acquired an extraordinary maturity. The reputation of the ministry of Lord Rockingham was tottering to its fall, crushed by the disasters in America, and confronted by an opposition which consisted of the Old Whigs who followed Rockingham, among whom Fox and Burke were conspicuously attached, and of the new Whigs, who were attached to the fortunes of Chatham, and who were chiefly represented by Shelburne, Camden, and Barré. Pitt lost no time in throwing himself
into the fray. He spoke on the 26th February with brilliant success in defence of Burke's Bill for Economical reform, and on several successive occasions he assailed the falling ministry. He demanded an alliance with the Commons, the severe influence of the crown with extreme violence, but he refused to throw in his lot irrevocably with the party of the opposition, and shortly before the fall of North he publicly declared that he could not expect to bear a part in the coming ministry, as he 'would never accept a subordinate position.' The words are said to have escaped from him in the heat of the debate, and the House was startled and a little amused at the arrogance of a young man who was not twenty-three, who was absolutely without official experience, and who had been little more than a private member of parliament, and he would accept no office except in the Cabinet.

But Pitt had attained a position that placed him far above lasting ridicule. Fox spoke of him as already one of the first men in parliament. Burke said of him that he was not a chip of the old block, but a new Adversary. It was said that he had shown logical powers that made men doubt whether he might not prove superior even to Fox; and when upon the resignation of North in March 1782 a ministry was formed under the leadership of Rockingham, combining the two secretaries of state, Pitt calmly refused his pledge and refused several offers, among others the Vice-treasurership of Ireland with a salary of £5000 a year. He gave, however, a general and cordial support to the new ministers, but he at the same time brought forward the question of parliamentary reform on which they were profoundly divided. It was a question which fell naturally to him, for his father had been one of the first to urge it. On the 7th May he moved, in a speech of great brilliancy, for a select committee to inquire into the state of the representation, and was only defeated by 161 to 141. He soon afterwards supported a measure of Sawbridge for shortening the duration of parliament, and a measure of Lord Mahon for preventing bribery at elections.

A close personal and political connection about this time grew up between Pitt and Henry Dundas, whose strong and active mind proved of great importance to the career of Pitt. Dundas had none of the intellectual brilliancy or of the moral dignity of the younger statesman, but he had one of the best political judgments of his time, he had great talents both for business and for debate, and his sanguine notion of himself as the judge of the characters of men—a gift in which Pitt through his whole life was somewhat wanting.

The Rockingham ministry lasted only for three months. The king detested it; it was from the first profoundly divided, and a litter personal and political animosity had broken out between Charles Fox and Lord Shelburne, its two most conspicuous members. On 1st July 1782 Lord Rockingham died, and the question of leadership at once broke up the party. Fox insisted on the leadership of the Duke of Portland, a wealthy and respectable, but perfectly undistinguished nobleman, who was then Lord-lieutenant of Ireland. The king gave the post of First Lord of the Treasury to Shelburne, who had an incomparably higher political position, and who had been a favourite friend and colleague of Chatham, though there were features in his character that excited the envy and distrust of Fox, with a considerable section of the Rockingham Whigs, at once resigned, and Pitt entered the Cabinet as Chancellor of the Exchequer in the reconstructed ministry. Public opinion generally blamed Fox, and some of the consequences of his resignation was that the House of Commons was divided into three distinct parties. There was the party of Fox, the party of North, and the party of the government, and no one of them could command a clear majority. A coalition of some sort was unavoidable. Shelburne proposed an alliance with North, but Pitt positively refused to have any connection with the statesman whom he deemed responsible for the American war. Peace was not yet attained, but the negotiations which had been pursued by the preceding ministry were steadily pushed on. Provisonsal articles of peace between England and the United States were signed in November 1782, and preliminary articles with France and Spain in the following January, while a truce was established with Holland, and the first steps were taken towards a very liberal commercial treaty with those states. Pitt bore a leading part in the debates in parliament, and his reputation steadily rose, but the Shelburne ministry was weak, divided, and short-lived. The peace following a disastrous war necessarily involved sacrifices that were profoundly unpopular, and the character of Shelburne aggravated the evil effects that had already appeared. Several resignations took place, but Pitt stood unshaken by his chief, and endeavoured without success to induce Fox to rejoin the ministry. Fox, however, declared that he would never again serve any ministry with Shelburne for its head, notwithstanding the influence of the king and of the country, he united with the very statesman whose expulsion from public power had been for years the main object of his policy, and whom he had repeatedly threatened with impeachment. North, irritated at the ostracism with which he had been treated, entered into the coalition. Two factious votes of censure directed against the peace were carried through the Commons by majorities of 16 and 17, and on 24th February 1783 Shelburne resigned.

Pitt had displayed the most splendid parliamentary talents in the discussions that preceded the fall of the ministry, and although he could not overthow the compact weight of parliamentary influence opposed to him, he profoundly moved the country and placed his own position beyond dispute. On the fall of the Shelburne ministry, the king had no hesitation in placing the yoke of the coalition, implored the young statesman to accept the leadership, and gave him an absolute authority to name his colleagues. It was a dazzling offer, and Pitt was not yet twenty-four, but he already possessed a judgment and self-command which is the true coin of a combination such brilliancy and such courage, and he saw clearly that the moment of triumph had not yet come. After a long struggle and many abortive efforts the king was obliged to yield, and on the 21 April the coalition ministry was formed with the Duke of Portland as First Lord of the Treasury, and Fox and North as joint Secretaries of State. It commanded a large majority of the votes, and included a great preponderance of the ability in the House of Commons, but the king viewed it with a dejection amounting to loathing, and the nation was profoundly scandalised by the alliance on which it rested. Pitt was offered his old post of Chancellor of the Exchequer, which he peremptorily refused. As leader of the opposition, he brought forward, in the form of resolutions, an elaborate programme of parliamentary reform, for an increase of the country members. He was defeated by 203 to 149, but he at least succeeded in bringing Fox and North into direct collision. He brought forward another important measure for the reform of abuses in the public offices, which passed the Commons, but his measure rejected by the Lords which was carried by the new ministry differed very little from that which they had
censured when in opposition; and very soon the bill of the government for subverting in some important respects the charter of the East India Company and reorganising the government of India, produced another great change in the disposition of power.

The feature of the scheme which chiefly excited indignation and alarm was the creation of an existing legislature of a new supreme body in England, consisting of seven commissioners who were to be immovable except by an address from either house for four years, and who were unlikely that period to have an absolute control of the patronage of India. It was contended that this measure would give the party who were now in power an amount of patronage which would enable them to overbalance the influence of the crown, dominate the parliament, and control succeeding administrations. These objections were brought forward by Pitt with great power, but with extreme exaggeration, and the king and the nation were speedily alarmed. The Indus Bill passed by large majorities through the Commons, but when it came into the House of Lords the king, as he contended, Lord Temple to say that he would consider any man his enemy who voted for the bill. The communication produced an immediate effect. The bill was rejected in the Lords by 95 to 76; the ministry resigned. In the House of Commons the Commons supported them by large majorities; but the king peremptorily dismissed them on 18th December 1783, and next day it was announced that Pitt had been called to the head of affairs as Chancellor of the Exchequer and First Lord of the Treasury.

Pitt had already abundantly displayed his parliametary ability, his judgment, and his discretion. He was now to display in the highest degree his courage. In the eyes of nearly all the best judges in England his position was a hopeless one, and his administration was likely to be even more brief than the three which had preceded it. There was a majority of more than a hundred against him in the Commons, and the parliamentary influence behind it was so great that an immediate dissolution must have been disastrous. He was called to office by the constitution and interference, on the part of the king, and every day which he remained in office under the censure of the House of Commons added to the falseness of his position. Temple, on whom he had greatly relied, threw up the great responsibility which he had accepted, and in the House of Commons Pitt was himself at this time the only cabinet minister, while Dundas was the only considerable minister who supported him against the united attacks of North, Fox, Burke, and Sheridan. But Pitt fought his battle with a skill and a resolution that have never been surpassed in parliamentary history. A long succession of hostile votes was carried, but they failed to drive him from office, and soon unequivocal signs appeared that the country was with him. The magnanimity with which at this critical period he refused to take for himself a great sinecure office which fell vacant added greatly to his popularity. Addresses in his favour poured in from all the leading corporations in the country. The majorities against him grew steadily smaller. At last, on 22nd March 1784, the long-deferred blow was struck. Parliament was dissolved, and an election ensued which swept away nearly 100 members of the opposition, made Pitt one of the most powerful ministers in all English history, and prepared the way for a ministry which lasted, with few months' intermission, for no less than twenty years.

In this great and powerful ministry English political life assumed much of its modern aspect. The House of Commons acquired a new importance in the constitution, the people a new control over its proceedings, and the First Lord of the Treasury complete ascendancy in the government. The system of 'king's friends' controlling the ministry was finally ended, and the first Lord Thurlow, attempted to perpetuate it, he was peremptorily dismissed. The skilful management of the regency question established the right of parliament to provide for the exercise of supreme power during the incapacity of the king. Direct elections for the parliament was the result. Great numbers of sincere places were abolished, and great reforms were introduced into the system of collecting the revenue and issuing public loans. The government of India was reorganised on the system of a double government, which continued with little change till the abolition of the East India Company in 1858. The whole system of taxation and of trade duties was thoroughly revised, and no minister since Walpole had approached Pitt in his complete competence in dealing with trade questions. The finances of the country, which had been extremely disorganised by the American war, became once more flourishing. A commercial treaty, based upon more enlightened commercial doctrines than any English statesman, except Shelburne, had yet adopted, was negotiated with oblivion. England, Prussia, and Holland contributed largely to terminate the wars between Sweden and Denmark and between the emperor and the Turks, though it met with a mortifying failure in its dealings with Russia. Pitt's love of peace was very sincere, but the influence of England in European councils was greatly under his ministry, and he showed much decision and tact in extricating England from a dangerous complicity with the ambitious designs of her Prussian ally. Up to the time of the French Revolution there was no decline in his ascendency, his popularity, and his success.

A few adverse criticisms, however, may be justly made. He cast aside too lightly on the first serious opposition parliamentary reform and the abolition of the slave-trade, and it became evident to good men of all parties that Pitt was a man of very little ability, and was ready to sacrifice great causes with which he had sincerely sympathised and which he might have carried, rather than raise an opposition that might imperil his ascendency. His once famous Sinking Fund is now universally recognised to have been thoroughly unproductive in its principle; and in the latter part of his career it led him to the absurdity of borrowing largely at high interest in order to pay off a debt that had been contracted at low interest. His attempt to establish free trade between England and Ireland failed and for the great uncertainty of his policy towards the Irish Catholics. The great evils which grew up in England in his time in connection with the sudden development of the factory system appear never to have attracted his attention or effort to mitigate them. He created peerages with extreme lavishness and with very little regard to merit, and although his patronage was not positively corrupt, few ministers have
shown themselves more indifferent to the higher interests of literature, science, and art.

When the French Revolution broke out his policy was one of absolute neutrality towards the contending parties, and this neutrality be most fatal almost to the eye of the great war he in understanding the character and the supreme importance of the Revolution. He believed that it was merely a passing disturbance, and that its principal effect would be to deprive France for some years of all serious influence in European affairs, and soon after with the transverse genius of Napoleon, Pitt, whilst he gained the profound swiftness of the war and the efficacy of his sinking fund, led him into the great error of raising his war expenses in the first stages of the war almost wholly by loans, and thus laying the foundation of an enormous increase of debt. His military enterprises were badly planned, badly executed, and he exhausted none of his father's skill in discovering and bringing forward military talent. For some years it is true his ascendency in parliament continued to increase, the great Whig schism of 1784 and the secession of Fox reduced the opposition to utter insignificance of which even he in his domestic measures Pitt was no longer fortunate. Through fear of the revolutionary spirit which had infected some portions of the population, he was led into repressive measures very little in harmony with his earlier career. Corn had risen to famine price, and great distress prevailed, and the government attempted to meet it by very ill-conceived relaxations of the poor-laws—by levying rates for the purpose of increasing wages, and by granting parochial relief in proportion to the number of children in a family, and thus offering a direct premium to have children. In Ireland, where disaffection was steadily growing, and Pitt tried to win the Catholics by measures of conciliation, and especially by the concession of the sufrage; but the opposition of the king, divided councils, and the vacillation of his own mind impaired his policy, and the injudicious recall at a very critical moment of a popular viceroy contributed largely to the savage rebellion of 1798. He then tried to place Irish affairs on a sound basis by a legislative union which was to be followed by Catholic emancipation, the payment of the priests, and the teaching of the deaf, but his last measure was carried by very corrupt means, but the king, who had not been informed of the ultimate intentions of his minister, declared himself inexorably opposed to Catholic emancipation, which he deemed inconsistent with his coronation oath. Pitt resigned his office into the hands of his follower Addington in February 1801; but a month later, on hearing that the agitation of the Catholic question had for a time overthrown the tottering intellect of the king, he declared that he would abandon the Catholic question during the remainder of his life, and on the 19th of May 1804 on the understanding that he would not suffer it to be carried. His last ministry was a melancholy and a humiliating one. The war, which had been suspended by the peace of Amiens, had broken out with renewed vehemence. There was great danger of invasion, and Pitt earnestly desired to combine the most eminent men of all parties in the ministry; but the king forbade the admission of Fox. The principal followers of Fox refused to join without their chief, and Lord Grenville and his followers took the same course. Lord Grenville, who was in the head of the Administra- tion, was now completely alienated. A junction with Addington was effect ed, but it lasted only for a short time, and it added little to the strength of the ministry. Dundas, Pitt's oldest friend and colleague, had been lately made Viscount Melbourne. He was placed at the head of the Adminis- tration; but a charge of misappropriating public funds was raised against him, and in 1805 he was driven ignominiously from office. Pitt's own health was now broken. His spirits had sunk; the spell which had once surrounded him had in a great degree passed away, and although the victory of Trafalgar saved England from all immediate danger of invasion, the disasters of Ulm and Austerlitz threw a dark cloud over his closing scene. He died in his forty-seventh year on 23rd January 1806. The House of Commons by a great majority resolved its funeral and a monument in Westminster Abbey.

He was never married, and he never mixed much in general society; but in all his private relations he was pure, amiable, simple, and attractive. He was a warm friend. His temper was very equable, and he was good-humored and kindly. For years he had much ready wit, and he could easily throw off the cares of office, and even join heartily in the games of boys. He maintained to the last his familiarity with the classics, but his serious interests were exclusively political. He only once crossed the Channel, and his absence was wholly untouched by the great contemporary currents of literature and non-political thought. He was not free from the prevailing vice of hard drinking, and he has been justly blamed for having allowed his great indifference to money to degenerate into a culpable carelessness. In 1801 some of his friends subscribed £12,000 towards the payment of his debts, and in the following year he sold Holwood, his country place. But these measures proved wholly insufficient. With no extravagant tastes, with no family to support, with no expenditure of any kind in London, with no source of revenue except the £10,000 a year, he left £400,000 of debt, which was paid by the nation. In public he was cold and repellent, and there was something theatrical in the unvaried dignity of his demeanour; but few men possessed to a higher degree the power of commanding, directing, and controlling, and he inspired the nation with an unbounded confidence both in his character and in his abilities. England has seen no greater parliamentary leader, few greater masters of financial and commercial legislation, and he was one of the first statesmen to adopt the teaching of Adam Smith, and his influence was very diffuse, if it showed little imagination, or depth or originality of thought, it was at least supremely adapted to all the purposes of debate, and it rarely failed in its effect. He was, in a word, a great peace-minister; but in the latter part of his life an evil fate brought him face to face with problems which he never wholly understood and with difficulties which he was little fitted to encounter.

His political life has been written in much detail by Tomlins and by M'Ivor (1804); but his life and the biography of him which has yet appeared is that of Lord Stanhope. Lord Macaulay has made him the subject of a well-known biographical essay, and Mr Goldwin Smith has written two biographies and three monographs by Mr Walford (1860) and Lord Rosebery (1891). The career of Pitt, however, is indissolubly interwoven with the whole English history of his time, and in that connection it may best be studied.
PITTSBURGH

Pittacus, one of the 'Seven Wise Men' (q.v.) of ancient Greece.

Pittenweem, a small seaport of Fife, a royal (since 1542) and parliamentary burgh (St. Andrews group), 3½ miles N.E. of Ely by rail, with fisheries.

There are ruins of a 12th-century priory. Pop. (1891) 1962.

Pittsburgh, officially spelled PITTSBURGH, the second city of Pennsylvania, is located at the junction of the Alleghany and Monongahela rivers, at the west end of the state, and is separated from the Ohio to the south by a distance of 1.5 miles.

The business portion of Pittsburgh is on a plain less than a mile in width, along the rivers, while the hills, commanding delightful views, are covered with handsome residences. In this region, where the prevailing sunny climates and sandstones have been worn away by the rivers to a depth of 500 or 600 feet, the horizontal layers of coal are exposed, and access afforded to the coal seam on the sides of the hills and at the bottom of the valleys to an extent elsewhere unknown; the great Pittsburgh coal layer, 8 feet thick, like a broad black band encircles the city, 300 feet above the river. This coal, which adds so much to the prosperity of Pittsburgh, is unequalled in quality for metallurgical purposes and is easily accessible, particularly on the Monongahela, where for 100 miles the coal outcrops on its banks and is easily transported by barges down the Ohio to Cincinnati, Louisville, New Orleans, and other river ports. Eighty towboats and thousands of barges, boats, and flat are engaged in the coal trade. In 1894 the coal tonnage of the Ohio river amounted to 50,952,000 tons. The same year nearly 8,000,000 tons passed down the Ohio, which amount, added to that sent away by rail or consumed in the city, fully equals two-thirds of the yearly output of bituminous coal for the entire state. On the Monongahela is the celebrooked coke works, which were first organized in 1868 and produced in 1897, 6,915,052 tons of unequaled coking.

Pittsburgh's manufactures include everything which can be made of iron, from a 58-ton gun to nails and tacks; steel in its various applications; all descriptions of glass and glassware; silver and nickel-plated ware; Japan and Britannia ware; pressed tin, brass, bronze; earthenware, crucibles, fire-pots, bricks; furniture, wagons, and carriages; brushes, bellows, mechanical supplies of all kinds; natural-gas fittings, tools for oil and gas wells, &c.

The Carnegie Steel Company, Limited, with a paid-up capital of $23,000,000, manufactures steel rails, billets, armour-plate, &c. The incandescent lamp has been brought to the greatest state of perfection in this city. The petroleum fields around Pittsburgh produced in the past four years 67,903,478 barrels of the highest grade of oil.

The position of Pittsburgh on the eastern border of the great Mississippi river-basin and her facilities for penetrating to every part by river and rail give her great natural advantages for trade and as a depot for exchange and transport and the produce that is manufactured and consumed by her in a market. Four lines of packet ply on the Monongahela and four on the Ohio. Fourteen distinct railroad routes here. The immense volume of trans-continental business passing through Pittsburgh annually is probably excelled by that of no other city except Chicago. Exclusive of freight in transit, the ascertained tonnage handled in 1897 was by rail 36,679,415 tons, and by river 7,318,366 tons, which is by far the greatest tonnage of any city in the United States if not in the world. Pittsburgh has thirty-one national banks, with 2,500 tellers. The total capital and surplus of $34,275,000. The city possesses a good system of public schools, is the seat of a Catholic college, the medical, law, dental, and pharmaceutical departments of the Western University of Pennsylvania, a college for women. Pittsburgh is the site of the world's largest of its kind; it has the largest number of preparatory schools and academies. The Carnegie Institute, to which Mr Andrew Carnegie has already donated two and a half million dollars, stands at the entrance to Schenley Park, and contains a large music hall, an art gallery, a library, and a museum. In the same park, a short distance from the Carnegie buildings, is the Phipps' Conservatory—a gift of Mr Henry Phipps, originally costing $110,000, filled with flowers and plants from every clime. In Highland Park is the coal-tar building, costing $100,000, the gift of several public-spirited citizens. The principal parks are the Schenley—a gift from Mrs Mary E. Schenley—located in the heart of the city, the Herron Hill Park, which commands an extensive view, and Highland Park, beautifully located on the banks of the Allegheny and Monongahela rivers. The two parks are crossed by fifteen bridges, some of them monuments of engineering skill; the heights within the city are reached by eleven inclined railways for freight and passengers, and all parts of the city and suburbs are easily reached by lines of electric cars.

History.—In the early history of America the site of Pittsburgh was a point of great interest, and was familiarly known as the 'Gateway to the West.' Here traders, settlers, and adventurers, who had worked their way from Philadelphia by a chain of forts, congregated, and here flat-boats were built which carried them down the Ohio to the unknown regions beyond. In 1754 a few English traders built a stockade at the point, but were driven away by the French the following April. The latter afterwards replaced the stockade by a fort, which, in honour of the governor of Canada, they called Duquesne. It was near the present outskirts of the city that Braddock (q.v.) was surprised in 1755; and on October 15, 1758, General Grant and his Highlanders overthrew the French near the court-house now stands when they were surrounded by the Indians and nearly exterminated.

The following month, however, General Forbes took possession of what remained of old Fort Duquesne, the French having fled down the Ohio, leaving the buildings in ruins on May 17, 1759. He then built a large and strong fortification, which, in honour of the elder Pitt (see CHATHAM, EARL OF), then prime-minister, they called Fort Pitt. The fort is
said to have cost the English government £60,000. The settlement became the incorporated city of Pittsburgh. Pop. (1810) 4768; (1840) 21,115; (1850) 86,076 (with Birmingham, 121,799); (1880) 156,389; (1890) 288,017; (1910) 321,765.

Pittsburgh, capital of Pennsylvania, on the Susquehanna River, 8 miles by rail N.E. of Wilkesbarre. It is in the centre of a field of anthracite coal, and has extensive mining interests, besides other industries. It is connected by electric trams with Wilkesbarre, Scranton and other cities; and by several bridges with West Pittston. Pop. (1900) 125,565.

Pituitary Body. A rounded body of the size of a small bean situated in the sella turcica in the sphenoid bone on the floor of the cavity of the skull. It contains small cavities lined by epithelium and it possesses many vessels. It derives its name from its having been once supposed to secrete the fluid which is now known to be yielded by the Schneiderian or pituitary membrane of the nostrils (see Nose). It is composed of two parts, the one a downgrowth from the floor of the third ventricle of the brain, the other an upgrowth from the pharynx, from which it has become completely separated. A disease called acromegaly is by some supposed to result from enlargement of this gland.

Pit Villages are collections of earth-caves, dug in the ground and covered with stones, wooden or wattle lids, or clay or sods of turf, and used by prehistoric races or by races at the lowest stages of barbarism. A good example was unearthed during the latter half of the 19th century near St Mary Bourne, north-east of Andover, in north-western Hampshire. The pits are reached by entrance shafts, sloped downwards. The pits themselves are oval or pear-shaped, varying between 22 and 42 feet in length, and are about 12 or 13 feet wide, and 5 feet high, with the fireplace in the centre. Flint and bone implements and rude pottery have been found in them.

Pityriasis (from the Greek word pityron, "brow" or "brow-shaped") is the name given to one of the squamous or scaly diseases of the skin, in which there is a continual throwing off of bran-like scales of epidermis, which are renewed as fast as they are lost. It is most common on the scalp, when it is known as dandruff, and must be treated with weak alkaline lotions, or, if these fail, with diluted white precipitate ointment, provided there is no inflammation. Pityriasis rubra is a severe disease, affecting the whole or almost the whole body, and closely allied to, if not identical with, a severe form of dry Eczema (q.v.). Pityriasis or Tinea versicolor is due to the presence of a parasitic fungus, the Microsporon fuscum; it occurs in the form of irregular yellowish or brownish patches, confined to the parts of the body covered by the clothes. Microscopic examination of the exfoliated scales shows the spores and filaments of the fungus. The treatment consists in, if possible, removing the cause. The best remedy is the application of a saturated watery solution of sulphurous acid gas, or of one of the sulphites dissolved in diluted vinegar, or of white precipitate ointment.

Pius, the name of nine among the Roman pontiffs, of whom the following only appear to call for particular notice.—Pius II., originally known as Aeneas Sylvius, was a member of the noble family of Piccolomini, and was born in 1405 at Consignano near Siena. His early life was stained with moral irregularities, and, like other humanists of his time, he wrote a very large number of books and treatises. He seems to have written at least one loose novel—Loretia and Euryalus. At twenty-six he was employed as secretary to Domenico da Capranica, Bishop of Fermo, at the Council of Basel. He soon developed a genius for diplomacy, and from 1432-35 was employed in missions to Scotland, England, and France. Returning to Basel he sided with the council in its conflict with the pope, and on the election of the antipope, Felix V., was chosen as his secretary. But, having been sent on an embassy to the Emperor Frederick III., he was without difficulty induced to return to Rome, and, by the empire, on several embassies and other missions of importance on behalf of the emperor. Up to this time he had lived a life of unrestrained self-indulgence, but at the age of forty his passions had burned themselves out, and he was able to take orders and make his profession his whole life's occupation—the only means of obtaining a reward adequate to his ambition. He won over Pope Eugenius IV. by the frankness of his apology and earned his gratitude by his adroitness in bringing back to the papacy the allegiance of the neutral German Church. Almost the last act of his pontificate was to make him with his own hands the bishop of Trieste. It was not, however, till the end of 1456 that Aeneas was free to leave the ungenial atmosphere of Germany, Nicholas V. had employed him without rewarding him, but Callistus III. created him a cardinal. On the death of Callistus in 1458 he was elected pope and took the name of Pius II. He possessed a marvellous power of adapting himself to circumstances, and the prolific and shifty intriguer made a most decorous pope. He was embarrassed by contests against Neapolitan and German affairs, and his reign is chiefly memorable for his efforts to organise an armed confederation of Christian princes to resist the progress of the Turkish arms. He died at Ancona, 14th August 1464, his last moments darkened by the failure of his great scheme. Aeneas Sylvius was one of the scholars of his age. His works were published at Basel (1 vol., fol., 1551), and consist chiefly of histories, or historical dissertations and materials of history. The most interesting of his writings, however, are his letters, which throw a vivid light upon their age. These may be found in the collection of a Dutch minister, or in another, compiled, or rather autograph, published under the name of the copyist Gobellinus, and apparently altered by his secretary Campagna.

See Voigt's Life (3 vols., Berlin, 1850-60); also two papers by Bishop Creighton in Macmillan's Magazine, vol. xiv., and vol. ii. (1882) of his History of the Popes during the Reformation.

Pius IV., Giovanni Angelo Medici, was born of humble parents at Milan in 1499, was educated at Bologna, and under Paul III. rose rapidly to be Archbishop of R aggrav, vice-legate of Bologna, and cardinal (1549). He was elected pope at the close of 1559. His reign is chiefly memorable as that in which the protracted deliberations of the Council of Trent were brought to a close. The famous Creed of Pius IV., or Tridentine Creed, was confirmed by a bull dated 28th January 1564. In 1564 he was placed by the Pope in the new, St Charles Borromeo. His Correspondence with the Emperor Maximilian II. has been edited by Schwarz (Paderborn, 1889).

Pius V., originally named Michele Ghislieri, was born of poor parents, in the village of Boville near Alessandria, in 1504, and at the age of fourteen entered the Dominican order. His merit was
recognised by Paul IV., who named him Bishop of Sutri and Nepi in 1556, and cardinal in the following year. His austere temper prompted him as inquisitor-general for Lombardy to employ the most rigorous measures for repressing the Reformed doctrines. Under Pius IV. he was translated to the see of Piacenza, and was chosen cardinal by his successor, January 8, 1566. As pope he laboured to restore discipline and morality at Rome, reduced the expenditure of his court, pro-
hibited bull-fights and other amusements, sup-
pressed prostitution, and regulated the taverns of the city. He introduced the Inquisition and strove to enforce everywhere the disciplinary decrees of the Council of Trent. The whole spirit of his pontificate is most strikingly exhibited in the decree by which he ordered the yearly publica-
tion of the celebrated bull, De Caena Domini (1568)—an attempt to apply to the 16th century the principles and the legislation of Hildebrand.

His impotent bull releasing Queen Elizabeth's subjects from their allegiance (1570) fell harm-
less even upon patriotic English Catholics in a hasty, and was limited by a subsequent bull. The pontificate of Pius V. was the expiration which he organised, with Spain and Venice, against the Turks, and which resulted in the great naval engagement of the Gulf of Lepanto, on 7th October 1571. Pius died in the following May, 1572, and was canonised by Clement XI. in 1712.

Pius VI., originally named Giovanni Angelo Braschi, was born at Cesena, December 27, 1717.

He was selected by Benedict XIV. as his secretary; and under Clement XIII. he was named to several important appointments, which led finally, under Clement XIV., to his elevation to the cardinalate (1773). On the death of Clement XIV, Cardinal Braschi was chosen to succeed him, February 15, 1775. His internal administration was enlightened and judicious. To him Rome owes the drainage of the Pontine Marsh, the improvement of the port of Ancona, the completion of the church of St Peter's, the foundation of the new Museum of the Vatican, and the general improvement and embellishment of the city. Soon after his accession he formed a Council of State, which was presided over by Joseph of Austria and Leopold of Tuscany, whose reforms had swept away much of the papal supremacy. The pope repaired in person to Vienna, but, though received kindly, failed to restrain the emperor from further curtailing his privileges. Soon after came the outbreak of the French Revolution and the confiscation of all church property in France. The pope banished his thunders in vain, and ere long the storm broke upon his own head. The murder of the French political agent Bessivole in a street scuffle at Rome (1792) gave the Directory an excuse for the attack. In 1796 Bonaparte took possession of the Legations, and afterwards of the March of Ancona, and by a threatened advance upon Rome extorted from Pins, in the treaty of Tolentino (10th February 1797), the surrender of these provinces to the Cisalpine Republic, together with a heavy war contribution. The murder of GeneralDuphot of the French embassy in December was avenged by Berthier marching on Rome and taking possession of the castle of St Angelo. Pins was called on to renounce his measures, and was deposed. His temporal and ecclesiastical powers were declared forfeited, February 20, and carried to Siena, and afterwards to the celebrated Certosa or Carthusian monastery of Florence. On the threatened advance of the Austro-Russian army in the following year he retired to Siena, and was succeeded by Prince Valence on the throne, where, worn out by age and grief, he died, August 28, 1790.

Pius VII., originally Gregorio Luigi Barnaba Chiaromonti, was born at Cesena, 14th August 1742. He entered the Benedictine order at an early age, taught philosophy and theology at Parma and at Rome, became Bishop of Tivoli, and on being created cardinal was translated to the see of Imola. After the death of Pius VI. Cardinal Chiaromonti was chosen his successor (March 14, 1800). Rome, which up to this time had been occupied by the French, was now restored to the papal authority, and in the July of that year Pius VII. entered into his capital; while next year the French troops were definitively withdrawn from the papal territory. He immediately failed to get any modification of the articles, and not six months after his return to Rome the troops of Napoleon seized Ancena, and finally in February 1806 General Moliis entered Rome, and took possession of the castle of St Angelo. Ere long a neore was imposed, which was annexed to the province of Fermo, Urbino, and Macerata to the kingdom of Italy. The usurpation was consummated (May 17, 1809) by a decree annexing Rome and all the remaining papal territory to the French empire. The pope on June 10 retaliated with a bull of excommunication directed against the robbers of the holy sea, yet without formally naming Napoleon. The unhappy pope was next removed to Grenoble, then to Savona, and finally to Fontainebleau. There he was forced into signing a new concordat, recognising the annexation of the Roman states to the empire (January 25, 1813). The fall of Napoleon allowed him to return, and on May 24, 1814 he re-entered Rome. The Congress of Vienna formally restored to him his territory, and the remainder of his reign was devoted, under the direction of Cardinal Consalvi, to the reorganisation of internal administration. Brigandage was sternly suppressed, as well as secret societies, especially that of the Carbonari; while the Jesuits were restored, and concordate concluded with Naples, Prussia, Wurttemberg, and other Catholic states.

Throughout his life Pins VII. was a model of gentleness, simplicity, benevolence, and Christian charity. He died August 20, 1823, after having broken his thigh through a fall.

Pius IX., Giovanni Maria Mastai Ferretti, occupant of the papal chair during one of the most eventful periods in the history of the papacy, was the fourth son of Count Jerome Mastai Ferretti, and was born at Sinigaglia, May 13, 1792. His epileptic attacks rendered him unfit for the Noble Guard, wherupon he turned to the study of theology, and was admitted to the seminarium, in December 1818. For five years he presided over the orphanage of Tata Giovanni, next accompanied the Apostolic delegate Monsignor Muzi to Chili. In 1825 he returned to Rome, was made canon of St. Maria in Trastevere, and was successively, March 14, 1827, a great hospital for destitute children. In 1827 he was made Archbishop of Spoleto by Leo XIII., and transferred to Imola by Gregory XVI. in 1832. In 1840 he became a cardinal, and on the death of Gregory XVI. in 1846 was elected at acclamation to succeed him. He was the leader of the reforming party, and twelve hours after his election Cardinal Garscik, Archbishop of Milan, reached Rome with instructions from Austria to
veto his election. He took the name of Pius IX., and entered at once on a course of reforms, by which he hoped to establish the papal government on a popular but yet firm basis. His first step was to grant an amnesty to all prisoners and exiles for political offences. He next removed most of the disabilities of the Jews, and made Rome a centre of a united railway system. In 1848 he projected a Consulta or council of state, and in March 1848 published his Statuto Fondamentale, a complete scheme for the temporal government of the papal states by means of two chambers, one nominated by the pope, the other (with the power of veto) elected by the people. At first the new pope was the idol of the populace. Mazzini hailed the new policy with enthusiasm, and Carlyle declared that 'the old chimera was rejuvenised!' But the revolutionary fever of 1848 spread too fast for a reforming pope, and the refusal to make war upon the Austrians finally forfeited the affection of the Romans. On November 15, 1848, his first minister, Count Rossi, was murdered in broad daylight, and two days later a threatening mob assembled in the square of the Quirinal. On the 24th the pope escaped to Gaeta, a Neapolitan seaport near the Bay of Naples. A rumour was proclaimed in Rome, the provisional heads of which proceeded with great moderation and wisdom to a complete and radical remodelling of the civil government of the state. Pius from his exile addressed a remonstrance to the various sovereigns. In April 1849 a French invasion of Italy had been sent to crush the revolution. On July 2 General Oudinot took Rome, after a siege of thirty days. The papal government was re-established, but Pius himself did not return until April 12, 1850. From this time his government, swayed by Antonelli, was the oracle of the Catholic church. The pontiff refused to proclaim the second amnesty. The war for the unification of Italy was ended in December, and a considerable part of the papal territory southward in the direction of Rome was annexed to the kingdom of Italy, but Pius persistently refused to cede any portion or to enter into any compromise.

In his ecclesiastical policy he was incessantly active, henceforward closely related with the Jesuits, and ever uncompromising in his ultramontanism, and to a large extent he proceeded to promulgate dogmatic definitions about problems that had been long unsettled by the wisdom of the ages. He re-established the hierarchy in England, he sanctioned the establishment in Ireland of a Catholic university, and condemned the principles upon which the Queen's Colleges in that country were constituted. He concluded with Austria a concordat much more favourable to church authority than the existing ecclesiastical laws had permitted. By the bull 'Ineffabilis Deus' (8th December 1854) he decreed as a doctrine of the faith the infallibility of the Pope, with the assistance of Virgin Mary; his famous encyclical 'Quanta Cura,' and the Syllabus, or list of prevalent errors especially to be reprobated, appeared in December 1864. But the most important event of his pontificate was the convocation of the Vatican Council, at which bishops from all parts of the Catholic world assembled in December 1869. It was adjourned in July 1870, after it had proclaimed the celebrated decree of the Infallibility (q. v.) of the Pope, when on a subject of faith or morals he issues a decree ex cathedra to the universal church. For the last ten years the pope's temporal dominions have been in a continual state of war, having been invaded by French bayonets, and on the withdrawal of the garrison at the outbreak of the war with Germany the soldiers of Victor Emmanuel crossed the frontier, and, after the short delay of a feeble and half-hearted defence, entered the city amid the acclamations of the populace, and so terminated the temporal power of the pope. The result of the plebiscite on October 2 was 40,805 for, and but 46 against, union with Italy, and for the rest of his days the pope lived a voluntary prisoner within the Vatican, having the mortification to see his capital become the centre of a united kingdom. In 1855 he purchased the island of Gorgona, and lived in the Quirinal with the affections of all his subjects. He renewed with all solemnity his oft-repeated protest, and refused the pension of 210,000 voted him by the national parliament. His loss was in some measure compensated by the renewal, as a result of his excommunication, of the abdication of the tribute of Peter's-pence (q. v.). In June 1871 his reign reached the unparalleled duration of twenty-five years, and on June 3, 1877, he celebrated the jubilee of his episcopal consecration. He died a month after Victor Emmanuel (to whom he sent the papal benediction), on 8th February 1878.

See Lives by J. F. Maguire (2d ed, New York, 1878), T. A. Trollope (2 vols. 1878), and W. Mann, M. A. (Kishin, 1878); also the articles ITALY, GARIABALDI, and MAZZINI.

Pizarro, Francisco, the conqueror of Peru, was the illegitimate son of a colonel of infantry named Gonzalo Pizarro, and was born at Trujillo in Estremadura, it is believed about 1470 or 1475. He received no education, and was not even taught to read and write, but entered the military service at the age of thirty, under Don Alvaro de Bazan, 'Great Captain' (Conde de Cordova) in Italy. In 1509 we find him at Darien in the expedition of Alonzo de Ojeda. He also served under Vasco Nuñez de Balboa when he crossed the isthmus and discovered the South Sea, led an expedition as far as Rio de la Santa, crossed the isthmus on the Pacific coast, and eventually became a citizen of Panama. In 1522 Don Pascual de Andagoya also reached Biron, and there collected information respecting the great empire of the Incas. Returning to Panama to prosecute the discoveries he became so ill that he was induced by the governor to hand over the enterprise to three partners, Francisco Pizarro, another old soldier named Diego de Almagro (q. v.), and a wealthy ecclesiastic named Hernando Luque. Pizarro was to lead the expedition, Almagro was to keep open communications with the Spaniards, and promised to contribute funds. Their first attempt was a failure, but in 1526 Pizarro and Almagro sailed in two vessels, with Bartolomé Ruiz, a very expert and gallant sailor, as pilot. Pizarro landed his men, Almagro returned to Panama for supplies, and Ruiz made a voyage to the southward, being the first to pass beyond the equator to cross the equator in the Pacific Ocean. Almagro returned, and the expedition proceeded southwards. But they were not yet strong enough to form any settlement, and eventually Almagro was sent back for reinforcements, while Pizarro and part of the force remained far as Biron, having crossed the equator in 1° 57' N., called Gallo. The arrangement caused much discontent. The men complained that they were being left to starve. The governor of Panama refused to give any further contribution to an enterprise which seemed doomed to failure, and two vessels, under Pedro Tafur, were sent to bring the people back from Gallo. Pizarro refused to return. Drawing a line along the sand, he called upon those who remained resolute to achieve success in spite of all difficulties to come over to his side. Thirteen men crossed the line. The natives welcomed Pizarro and his devoted little band removed to another island, called Gorgona, where there was more game and better water. For a long time the governor of Panama refused to allow any help to be sent. At last Ruiz was allowed to sail with one small vessel. He reached Gorgona, and Pizarro embarked, full of
PIZARRO

211

hope. Sailing southward they reached the Peruvian port of Tumbes, and collected full information respecting the empire of the Incas. Returning to Panamá, Pizarro proceeded to Spain to apply for authority to undertake the conquest of Peru. The capitulation between Spain and Peru depended upon the marriage of his sister, Juana, and Pizarro was signed on 26th July 1529. Pizarro was made adelantado and captain-general, while Almagro received the title of marshall. Pizarro took back with him his four brothers, Hernando, Juan, Gonzalo, and Joaquin Martin de Almagro. He sailed from San Lucar on 19th January 1530, and from Panamá on 28th December 1531, with three vessels carrying 183 men and 37 horses. Almagro was to follow with reinforcements. Landing at Tumbes, the Spaniards commenced the march inland in May 1532, and on 15th November entered the city of Cajamarca. The Inca Atahualpa, after defeating his brother and ending a long civil war, was in the neighbourhood, on his way to Cuzco, the capital of the empire. Pizarro captured the native sovereign by treachery, and after extorting an enormous ransom, amounting to 4,693,570 ducats (£3,500,000 of our money), treacherously put him to death on 29th August 1533. The royal share of the treasure was sent to Spain, with tidings of the conquest. Pizarro then marched to Cuzco, and set up the Inca Martín as a nominal sovereign. On 6th January 1533 Pizarro founded the city of Lima, as the capital of his new government. He was created a marquis by the Emperor Charles V., while Almagro was empowered to occupy territory for 260 leagues from the southern boundary of his government. But the southern boundary was not fixed. Almagro declared that Cuzco was within his grant, but was induced to forego his claim, and to undertake the conquest of Chili. The marquis was busy founding cities on the coast, while his brothers were at Cuzco, when a great insurrection of the Indians broke out. Both Cuzco and Lima were closely besieged, and Juan Pizarro was killed. For many months the Spaniards were in great danger, but in the spring of 1537 Almagro returned from Chili, raised the siege of Cuzco, and took possession of the last of the Inca's lands. The Marquis Pizarro had no intention of allowing his rival to retain Cuzco. Too old to take the field himself, he entrusted the command of his forces to his brothers, who defeated Almagro on 26th April 1539, and entered the city soon afterwards. The prosperity of his followers was confiscated. Pizarro remained at Lima, consolidating his power, and despatching various expeditions for discovery and conquest. But Almagro's followers were driven to desperation; they were called in derision 'men of Chili,' and the marquis treated them with contemptuous indifference. One of them, named Juan de Rada, matured a conspiracy for the assassination of the governor. The conspirators attacked his house during the mid-day meal, and murdered the old commander between the first and second course on 20th June 1541. The body of Pizarro was buried in the cathedral by stealth and at night. Francisco Pizarro is one of the most prominent figures in the history of Spanish conquest in the New World. His reputation rests on the determination of a man of inflexible constancy of purpose, equal in the infinite resource. His followers were devoted to his service, and some of his friendships endured until death. The indelible stain on his character is the treacherous execution of the Inca Atahualpa. All the capital punishment he gave to the greatest of his position, and proved himself to be an able and far-seeing administrator. Falling by the hands of assassins, he was defended by devoted friends, and died as bravely as he had lived. Pizarro was never married. By the Inca princess, Inez Huayllas Nusta, a sister of Atahualpa, he had two children—Gonzalo, who died young, and Francisca, who went to Spain with her step-father, Don Francisco Anupuerco, a knight who married Inez after the assassination of the Grand Inca. His uncle Hernando Pizarro was created a marquis at Cuzco, and by him had three sons and a daughter. Hernando, for having beheaded the Marshal Almagro at Cuzco, was imprisoned in the castle of Medina del Campo, from which he was set at liberty, when he remained until 1556. He married his niece during his imprisonment, which could not have been very rigorous. He died at Trujillo, the original home of himself and his brothers, in 1578.

GONZALO PIZARRO, brother of the Marquis Francisco Pizarro, served with his father in Italy when a boy. He accompanied his brother Francisco in the conquest of Peru, and did very good service when the Indians besieged Cuzco, and in the conquest of Chacras. In 1539 Gonzalo Pizarro undertook an expedition to the so-called Land of Cinnamon, the forest-covered region to the eastward of Quito. He left that city with 350 Spaniards and 4000 Indians on Christmas Day, and the hardships and sufferings endured by Gonzalo and his companions have seldom been equalled. Descending the rivers Coca and Napo, Gonzalo enticed the command of a small vessel from the lawful owner, and gave it to one of his lieutenants, who was to go in advance and seek for supplies. But Orellana deserted his starving comrades, discovered the whole course of the river Amazon, and returned to Spain. Out of the 350 Spaniards that left Quito 50 deserted with Orellana, 210 died of hunger and disease, and the miserable remnant returned to Quito with their intrepid leader in June 1542.

When Gonzalo Pizarro heard of the assassination of his brother the marquis he retired to his estates in Chacras. In 1544 the new viceroy, Blas Nuñez Vela, arrived in Peru to enforce the 'New Laws.' The Spaniards were dismayed, and entreated Gonzalo to leave his retirement and protect their interests. He consented, chose an old veteran named Francisco de Carabjal as his lieutenant, and assembled a force of 400 men. Pizarro was killed, and Gonzalo entered Lima in triumph on the 28th of October 1544 at the head of 1200 Spaniards, and several thousand Indians dragging the artillery. He was declared governor of Peru. Blasco Nuñez Vela died while he was at Lima, and Gonzalo was made viceroy and governor general of Peru. He was called Carabjal, and defeated and killed in the battle of Arica on January 18, 1546. Gonzalo Pizarro was undisputed master of Peru. Carabjal retired to Chacras to work the silver-mines.

When news of this revolt reached Spain the licentiate Pedro de la Casca, an astute and very able ecclesiastic, was appointed to proceed to Peru as president of an 'Audencia,' or court of five judges, and to restore order. He sailed in May 1546, and arrived at Panamá in August, where he gained possession of Pizarro's fleet by a combination of means. He arrived at Lima on 25th June 1547. Gonzalo Pizarro, desiring of being able to make head against the president, determined to retreat into Chili. But there was a force, under an officer named Diego Centeno, hanging in the wings of his host, and determined to do it first. Centeno was utterly defeated in the battle of Huarina, near the banks of Lake Titicaca, and the doomed Pizarro was so elated at the victory that he abandoned all idea of retiring into Chili. He advanced to Cuzco, and the President Casca approached him by leisurly marches, encamping on the plain of Saquishana, near Cuzco, in April 1548. On the 9th Pizarro and Carabjal marched out of Cuzco, and both sides made ready for battle. But soon there were symptoms of desertion on
Pizzacato. a phrase used in music for the violin or violoncello, to denote that there the strings are to be twitched with the fingers in the manner of a harp or guitar.

Placebo (Lat., 'I will please'), in the Roman Catholic service of vows for the dead the name of the first antiphon, which begins with the word. In medicine it is an epithet applied to a remedy intended to humour or gratify a patient rather than to exercise any curative effect.

Place-names. See Names.

Placenta, or After-birth, the structure which unites the unborn mammal to the womb of its mother and establishes a nutritive connection between them. It is a peculiar organ of transitory nature, and is a part of the maternal surface, and is not developed in Ornithorhynchus and Echidna, which lay eggs, nor is it more than incipient in the Marsupials, which bring forth their young after a short gestation. In all other mammals it occurs in various forms, partly embryonic in its origin, partly maternal, always active, and always a double type, or a sponge, by means of which the blood of the mother nourishes and purifies that of her unborn young. Vague prophecies of it occur in two cartilaginous fishes and in two lizards, in which there is a connection between the yolk-sac of the embryo and the wall of the ovipore.

In the hedgehog, which is a conveniently central type of mammal, the connection between embryo and mother has the following history. (a) The outer wall of the embryonic sac is moored to the wall of the mother by small cellular outgrowths, known as the preliminary 'villi,' and minute cavities between these are bathed by the blood of the mother. (b) The growing embryo becomes ensheathed by the double folds of the Amnion, the inner parts of which form the 'amnion proper,' while the outer form the 'extra-embryonic wall of the embryo.' Part of the yolk-sac wall fuses with this sub-embryonic membrane; from the united area vascular villi grow out into the wall of the uteri, which is now much modified. Thus is formed a yolk-sac placenta, as exhibited for a time by Insectivores and Bats. But the most important union between mother and offspring is that due to the union of Allantois (q.v.) and sub-embryonic membrane. If there has been a yolk-sac placenta it dwindles before this new and more efficient union. From the united area vascular villi grow out into depressions or crypts in the uterine wall, part of which is modified into a spongy vascular tissue. In Insectivores, Bats, and Rodents the original outer wall of the embryonic sac persists between the placental vill and the maternal blood, and mediate between these by means of a capillary network. The term 'chorion' has been used in so many senses, that it seems advisable to abandon it. It is best applied to the union of sub-embryonic membrane and allantois ('true chorion'), or to the union of sub-embryonic membrane and yolk-sac ('false chorion').

The embryonic part of the placenta necessarily comes away at birth, and sometimes the vascular part of the maternal placenta is also discharged when the young is born. When this is the case, the placenta is called 'deciduate,' or better 'non-chorionic.' Of non-chorionic presentation two kinds are distinguished: Diffuse, when the villi are scattered over the surface of the embryonic sac in Manis among Edentates, in the dugong, in Cetacea, in most Ungulates except Ruminants, in Lemurs; Cotyledonal, when the villi occur in patches (in Ruminants). Of cotyledonal presentation three kinds are distinguished: Zonary, when the villi form a partial or complete girdle round the embryo, in Orycteropus and Dasyus among Edentates, in Elephants and Hyaen, in Carnivora; Discoidal, when the villi occur on a circular cake-like disc (in most Edentates, in Insectivores and Bats, in Rodents: Meta-discoidal, when the villi are at first extended, but are afterwards restricted to a disc (in Monkeys and in Man). Sir William Turner, the 'grand-master of placental research,' allot the lowest place to such diffuse forms of placenta as that of the pig, but others maintain that the discoidal type as illustrated in the Igname vora is the most primitive. In Botany 'placenta' usually means the portion of the Ovary (q.v.) which bears the ovules. See also AMNION, ALLAN- TOIS, FETUS, MAMMAL.

Placenca. See Placenta.

Placentum Regium (called also Placet, Exegetuar, Lettres Patentes) is an act or instrument executed in virtue of the privilege claimed by the government in certain kingdoms to exercise a supervision over the communications of the Roman pontiff with the clergy and people of those kingdoms, and to suspend or prevent the publication of any brief, bull, or other papal instrument which may appear to contravene the laws of the kingdom, or to compromise the religious liberties of the Christians. In England the Statute of Praemunire (q.v.) was an example of this tendency.

Placoid Fishes. an order of fishes, in the classification proposed by Agassiz, characterised by having placoid (Gr. plax, 'a flat plate') scales of hard bone, not imbricated, but placed near together in the skin. They are all Cartilaginous Fishes (q.v.). See SCALES.

Plagal. See PLAIN-SONG.

Plagioclase. See FELS Path.

Plagiostomata. See CARTILAGINOUS FISHES.

Plague, a term used in the middle ages of all fatal epidemics indiscriminately, but now restricted
to a very malignant kind of contagious fever prevailing at certain times and places epidemically, characterized by buboes, or swellings of the lymphatic glands, and sometimes, when the disease was severe, that person had started from Lower Egypt; but from this time frequent epidemics occurred in Europe, culminating in the Black Death (q.v.) in the 14th century. It continued to ravage the north and west of Europe up till the 17th century. The last outbreak in England in 1663-65 caused the 'Great Plague of London,' and spread almost all over the country (see LONDON, Vol. VI. p. 699). Since the end of the 17th century it has only twice visited western Europe; in 1707-14 it spread from Russia and Hungary as far as Sweden, Denmark, Prussia, and Bavaria; and in 1720-22 being introduced from Syria into Marseilles, it destroyed almost half the population there, and spread through Provence. During all this time its most constant seats, so far as is known, were the countries bordering the Eastern Mediterranean—Lower Egypt, Syria, Asia Minor, and Turkey in Europe. By 1800 all these it has meantime disappeared. The last cases known in Egypt occurred in 1844, and in the others in 1841. It was hoped that the disease had become extinct, but since then it has occurred more than once in Arabia, Tripoli, Persia, and Arabia; and in 1873-75, and 1876-77, in China. In 1873-75, and 1876-77, in China. In 1875 the disease occurred in India, and 1876-77, in China. It has been present in India at least since 1815, sometimes in epidemics (e.g. the 'Pati plague,' 1830-38), but most constantly in districts on the southern slopes of the Himalayas; and it is said to be always found in some parts of India. An occurrence of the disease in Hong Kong in 1894 was followed by the fearful visitation at Bombay (q.v.) and adjoining parts of India in 1896-98.

It is the most destructive of all known epidemics. Barely less than 60, sometimes 90 per cent. of those attacked died. The disease carries off half the population of a town or of a district in which it prevails, and it may completely root out whole families, so that no survivor remains. The Black Death of 1348-50 is believed to have destroyed not less than a quarter of the population of Europe. The general symptoms resemble those of other severe fevers: shivering, rise of temperature, ache in head, back, and limbs, sickness, &c. Great weakness succeeds, with mental disturbance leading to coma or delirium. Death often occurs before any characteristic symptoms are developed; but at an early stage dark spots or patches often appear on the skin, produced by subcutaneous hemorrhages (petechiae, ecchymoses), and bleeding may also take place from the various mucous membranes. Bleeding from the lungs, though rare in recent epidemics, was regarded as a characteristic symptom of the Black Death in its most virulent form. About the second or third day the most distinctive features of the disease are developed—viz., one or more buboes or glandular swellings, usually in the neck, armpits, or groins; these generally become hard and prolonged swellings. In a few cases they are absent altogether. Carbuncles do not frequently develop at a later stage of the disease. Good nursing, good nourishment, free stimulation, and early opening of the buboes are helpful. Various treatments with diaphoretic and purgative medicines have been used in the Bombay epidemic of 1896-98. There can be no doubt that it is a highly infectious disease, and that the infection may be conveyed by clothes, bedding, &c., as well as by direct contact with the sick. In all epidemics it has been observed that the unhealthy conditions produced by poverty and filth are extremely favourable to the disease, and that it has been much less prevalent and severe among those in comfortable circumstances and healthy surroundings.

See Hucker's *Epidemics of the Middle Ages* (published by the Sydenham Society, 1844); Hirsch's *Geographical and Historical Pathology* (vol. I., New Sydenham Society, 1853); and the articles BLACK DEATH, ENDEMIC, PLAGUE.

Plague is a frequent trouble of theRomney Marsh, a common flatfish in the same genus as the flounder. It usually inhabits sandy and muddy banks off the European coasts from France to Iceland. Like the flounder, it may pass off estuaries into rivers, and can even thrive in fresh-water ponds. It often lies slightly buried with its eyes exposed and watchful for prey. The food consists of molluscs, crustaceans, and worms, but especially of the first. It spawns in early spring, and is in best condition about the end of May. It was once a common belief that shrimps were the parents of place. The place is rather broader in proportion to its length. The average size is 2 to 3 pounds, but much larger specimens are often caught; the coloured side is predominantly olive-brown with orange spots, but the colour changes rapidly in precise harmony with that of the ground on which the fish rests; six blunt toes extend from the eye to the beginning of the lateral line, which has an almost straight course.

Plain. See Highlands.

Plain, a geographical term which hardly admits of precise definition. It is generally applied to extensive tracts of approximately level or undulating country, which occur at less than 1000 feet above the sea. Broad areas of similar character at higher elevations are usually termed Tablelands (q.v.) or Plateaus. This is the general rule, but when the surface of a plain slopes gradually upwards to heights of several thousand feet, the whole tract is still called a plain. As an example may be cited the great plains east of the Rocky Mountains, which fall imperceptibly away towards the east from an elevation of 6000 feet or so. Among the most characteristic plains are the wheat lands of the greater rivers. But the term is extended to such low-lying regions as the Netherlands, the Midlands of England, the middle Europe, &c.—regions which have no great elevation and present a gentle undulating surface, interrupted now and again by isolated hills, and lines of cliffs and escarpments. From the same point of view the whole interior of North America lying between the Rocky Mountains in the west and the Alleghany and White Mountains in the east, and extending from the Gulf of Mexico to the shores of the Arctic Ocean, may be called a plain. So likewise more than half of Europe is a plain that is continued into Asia, and extends through the vast regions of that continent. Plains necessarily differ much in appearance according to the nature of soil and climate, from the dreary, sandy wastes of North Africa to the luxuriant fertility of the South American savannas, and to the wide rectangular level ground in each of the great continents have acquired various names, such as the Steppes and Tundras of eastern Europe and Asia, the Deserts of Arabia and Africa, the Savannas and Prairies of North America, and the Llanos, Pampos, and Serras of South America.

Plainfield, a city of New Jersey, on Green Brook, 24 miles by rail WSW. of New York, many of whose business men have their homes here.
Clothing, hats, and machinery are manufactured. Plo. (1890) 11,267; (1900) 15,369.

Plain-song. Plain-Chant, Gregorian Giant, or Gregorian Music, is the music used in the Christian church of the West from the earliest times, still in use in all Roman Catholic churches, and extensively revived since the rise of the High Church party in the English Church. Many good musicians, however, consider its interest as antiquarian rather than musical. Its distinguishing points are (1) its recitative-like character, as opposed to what was styled musica mensurata—i.e. barred music, with a marked and regular rhythm, which was the essential point of ancient Greek music, and more or less of nearly all modern music; (2) the modes, or scales, in which it is written, which are more numerous and varied than the modern major and minor; and (3) its being (originally) sung in unison, though much of it is susceptible of treatment in harmony, and is now frequently so heard. It used to be stated also that the notes in it were all of equal length, but this view is now generally repudiated and condemned. It embraces music for all parts of the Roman services, from the Accents (nearly in monotonous) proper to the various readings to the more elaborate melodies of the antiphons and hymns, and the various parts of the mass. The best known and most ancient of all is the music of the eight Tones sung to the Psalms, commonly called the Gregorian Tones. As to the origin of these many different views prevail, some ascribing them to a Greek, some to a Hebrew source, others to the early Christians; there seems some probability, though there is no direct evidence, that they were actually derived from the music of the temple service. As at first plain-song was handed down orally only, and the early systems of notation were very defective, it is impossible to determine how far it may have been corrupted. It was first reduced to system by St. Ambrose (died 397), but much more extensively by St. Gregory the Great, towards the end of the 6th century. There have of course been large additions since. How he noted the music is uncertain; the early notation and rules of plain-song were so complicated that it is said ten years' study were necessary to acquire a mastery of them. Local varieties of the proper modes gradually sprang up, almost every diocese having an office-book peculiar to itself—e.g. the antiphonary and gradual of Sarum, said to be one of the purest. The earliest known existing record of plain-song is the Antiphonarium, or rather Gradual, in the library of the monastery of St. Gall in Switzerland, probably of the 8th or 10th century. Various directories have been published, notably that begun by Palestrina and finished by Guidetti; the latest, issued under sanction of the pope, is the great series published at Ratisbon by Pustet, beginning in 1871 with the Gradual. The music is still always printed in the old square notes on a stave of four lines. At the Reformation the Gregorian music was adapted to the new vernacular services of the English Church by John Marbeck, who published in 1530 The Book of Common Prayer noted; and his arrangement is still in use in cathedral services. Anglican Chants (q.v.) are modelled on the Gregorian psalm tones.

The modes, or scales, of plain-song require some explanation. Their variety has been acknowledged by first-rate authority as affording greater resource of expression than our major and minor modes; and music has been written in them by great modern composers—e.g. the 'Hymn in the Lydian Mode' in Beethoven's Quartet, op. 132. They

**SPECIMEN OF ANTIPHON, LEADING TO A PSALM, SET TO THE FIRST TONE, FROM THE RATION 'VESTERAL,' TRANSLATED AND IN MODERN NOTATION.**

**Psalm Cxii. Verse 1.**

Blessed is the man that fear eth the Lord.

Second Reciting Note.  

Ending, 1st form. (Tones 3, 4, 7, and 8 have more than one form of ending.)

He hath great delight in his commandments.

Reciting Note.  

Mediation.
were derived from, though it is not certain that they were identical with, the Greek diatonic scales, after which they have been named. The principle of their formation is that each of the seven natural notes of the diatonic scale forms the keynote, or 'final' of a mode, which embraced that note and the five notes below it, carried down an octave, and no flats or sharps are found except an occasional B flat.) This would give us seven modes; but to each of these is attached another, in which the melody lies between the keynote and its octave, but in the other between the fourth below and the fifth above the keynote. But while the mode Dorian (authentic) embraces the notes from D of the bass stave to the D above, and has its keynote on D; the 2d or Hypo-dorian (plagal) has the same keynote, but its compass is from the A below to the A above it; the 3d or Phrygian (authentic) and its corresponding plagal mode, the 4th or Hypo-phrygian, is to be distinguished from them by its keynote on the E of the third space of the bass stave; the 5th or Lydian and 6th or Hypo-lydian have F for final; the 7th or Mixo-lydian and 8th or Hypo-mixo-lydian have G; the 9th or Æolian and 10th or Hypo-æolian end on A; and from these are derived all the other modes. The other modes are numbered variously as 11th and 12th, or 13th and 14th, according to the rejection or inclusion of the two preceding. The Ionian is the mode numbered 1, and the arrangement of the modes was said to have been confined to the 1st, 3d, 5th, and 7th modes (authentic); while the relative plagal modes, 2d, 4th, 6th, and 8th, were added by St. Gregory. In these are written the correspondingly relative modes, in the psalm tones of St. Gregory, with the Gregorian Tone, used only for the psalm In exitu Israel, in the 9th mode. The other modes were finally added in the 8th century under Charlemagne. Each mode has its reciting note, or Dominant—not to be confounded with the modern term in harmony.

Various specimens of plain-song hymn melodies will be found in Hymns Ancient and Modern—e.g. No. 14, the vesper hymn of St. Ambrose, 'O Lux beata Trinitas'; and No. 96, the hymn of Fortunatus, 'Vexilla Regis prodeunt,' which may be studied in a different treatment by Coussin in the "March to Calvary." See his Redemotio.

See the Rev. Thomas Helmoc's Manual, Brief Directory, and Primer of Plain-song; various articles by Mr. W. S. Bockstoce in Grove's Dictionary of Music; and the Magister Choralis, by Rev. W. K. Haberl (trans. by Dr. S. P. Bhaskar). The earliest list of the official Roman Directorium was printed in 1574, also at Ratisbon, by Pustet. See also the article HARMONY.

Planarian. a term practically co-extensive with trematode, applicable to the members of the lowest class (Turbellaria) of worm-like animals. They live in fresh and salt water and sometimes in damp earth. They are unjointed 'worms' with a ciliated skin; the food-canal is often branched, but has no posterior opening; from the simple brain two lateral nerves extend backwards; the body-cavity is undeveloped; there are no respiratory or eirenutary organs; the excretory system consists of branching tubes ending in ciliated cells; all other organs are simple; the life-history and the natural history, simplicity is well illustrated by the fact that some multiply by dividing into two, while a fragment of others may re-grow the whole. In Microstoma linfare a temporary chain of eight or sixteen individuals is sometimes formed by budding. In diet they are carnivorous, but a few are parásites —suggesting the next class of Trematodes. As illustrative genera we may note Planaria, in fresh water; Vortex and Convoluta, with green species (the colour being probably due to partner Algae); Gunda, with hints of segmentation; Microstoma and Stenostoma, the two subclass genera; Graillla and Anoplophilium, parasitic; Bipalium and Geodesmus, on land; Cephaloplane and Ctenoplana, in some ways suggestive of the Colerentor Ctenophora.

Planche, JAMES ROBINSON, playwright, archeologist, and herald, was born in London, 27th February 1796, the son of a watchmaker of Huguenot descent. His earliest dramatic exploit was produced at Drury Lane Theatre in 1818, and others soon followed. In 1823 he designed for Charles Kemble the dresses and appointments for the play of King John, and afterwards for other Shakespearean productions. In 1824 he wrote English words for Berlioz's Damnation of Faust, which was produced at the Olympic, nearly 200 dramatic pieces came from his pen—the most adaptations, but a large number original dramas (e.g. Charles XII) and entertainments. Of the five five numbers were published in 1830. In 1843 he helped to found the British Archaeological Association, and for many years he contributed valuable papers to the proceedings of the Society of Antiquaries. In 1854 he was made Ronce Croix Pursuivant, and in 1866 Somerset Herald; in 1872 he received a civil list pension of £250 a year. He died 29th May 1880.

Among Planche's works, besides two histories of British costumes and a Cyclopaedia of Costumes, are his Introduction to Heraldry (18th ed. 1860); Regal Records, or a Chronicle of the Royal Arms of England (1838); The Pursuivant of Arms (3d ed. 1874); and The Conqueror and his Companions (2 vols. 1874). See his Recollections and Reflections (2 vols. 1872).

Planche, a thin heart-shaped piece of wood mounted on three props, two of which are furnished with castors, and one is a pencil which may be made to trace characters on a sheet of paper by resting the fingers upon the instrument, and thus almost insensibly steering it in any direction required. Its use is as a supposed medium for spiritualistic communication; and it is one of the more sensitive modes for the transmission of information. It is used in the proceedings of the Psychical Society (1888, &c.).

Plane (Platamun), the sole genus of trees of the natural order Platanaceae. The species of plane are few; natives of temperate climates in the northern hemisphere, but also found, though in small palmate leaves and smooth whitish bark, which annually scales off in large pieces.—The Oriental Plane (P. orientalis), a native of Greece and the East, was planted by the Greeks and the Romans as an ornamental tree, and was cultivated for centuries the yhouth of Greece assembled under its shade in the groves of Academus to receive lessons in philosophy. The plane is still planted for shade...
and ornament in the south of Europe. Many fine trees exist in England, but they were at one time much more numerous, great part having died in the end of the 18th century. The spring frosts and the insufficiency of the summer for the proper ripening of the wood render Scotland less suitable for its cultivation, yet there is a tree at Gordon Castle 66 feet high. No tree better endures the atmosphere of a large city, and there are no finer trees within the precincts of London than its plane-trees. Noble specimens are to be seen in Hyde Park and Russell Square, in London, and the avenue of the Thames Embankment is formed with this tree. In the East the plane attains an immense size. One tree in the meadow of Boyndiere, on the banks of the Bosphorus, is 141 feet in circumference at the base, extends its branches 45 feet from the trunk, and is believed to be more than 2000 years old. The wood of the plane, when young, is yellowish white; when old it is brownish, fine grained, takes a high polish, and is esteemed for cabinet-making. A rich alluvial soil and the vicinity of water are most suitable to this tree. The North American Plane, or Buttonwood (P. occidentalis), is a very similar tree. It is the largest deciduous tree of the United States, and abounds on the banks of the great rivers of the middle states. Its timber is not very valuable, and is very liable to decay. A tree of this species on the bank of the Thames, in Chelsea Hospital gardens, is 115 feet high, with a trunk 5 feet in diameter.—The name plane-tree is commonly given in Scotland to what in England is known as the Sycamore (Acer pseudes), which resembles the true planes in its foliage, but is neither a plane nor a true sycamore, being really the Greater Maple. See MAPLE.

**Planetarium.** See Orrery.

**Planetoids, or Asteroids, are now usually known as Minor Planets.** See PLANETS.

**Planets** (Gr. πλανήται, 'a wanderer') are those heavenly bodies (including the earth) which belong to our solar system, and revolve in elliptic orbits round the sun. They are often denominated primary planets, to distinguish them from the satellites or satellites, which are called secondary planets. The name planet is of considerable antiquity, and was applied to these dependent planets to distinguish them from the myriad of luminous bodies which stud the sky, and which present to the naked eye no indication of change or revolution (see STARS). The planets at present known are, in the order of their distance from the sun, Mercury, Venus, the Earth, Mars, the Planetoids (q.v.), Jupiter, Saturn, Uranus, and Neptune. Six of these, Mercury, Venus, the Earth (which was not, however, the first to be reckoned a planet), Mars, Jupiter, and Saturn, were known to the ancients; Uranus was discovered by Sir William Herschel (q.v.) in 1781; and Neptune, after having its position and elements determined theoretically by Leverrier and Adams, was discovered by Professor Challis and Dr. Galle in 1846. (The Planetoids, of which some 300 are now known, have all been discovered since January 1, 1801. Six of the planets, the Earth, Mars, Jupiter, Saturn, Uranus, and Neptune, are attended by one or more satellites; Uranus (generally), Neptune, almost all the Planetoids, and all the satellites except the Moon are invisible to the naked eye. The visible planets can be at once distinguished from the fixed stars by their clear steady light, while the latter have a sparkling or twinkling appearance. The planets, as observed from the Earth, move sometimes from west to east, sometimes from east to west, and for some time remain stationary at the point where progression ends and retrogression commences. This irregularity in their movements was very puzzling to the ancient astronomers, who invented various hypotheses to account for it. See PTOLEMAIC SYSTEM, by The system of Copernicus, by assuming the sun, and not the earth, as the centre of the system, explained with admirable simplicity what seemed before a maze of confusion.

The planetary orbits differ considerably in their degrees of eccentricity, the Planetoids, Mars, and Mercury being most, and the larger planets least eccentric. No two planets move exactly in the same plane, though, as a general rule, the planes of the larger planets nearly coincide with that of the ecliptic. The latter are consequently always to be found within a small strip of the heavens extending on both sides of the ecliptic; while the others have a far wider range, Pallas, one of them, having the angular elevation of its orbit no less than 34° 42' above the ecliptic. According to Kepler's Laws (q.v.), the nearer a planet is to the sun the shorter is the time of its revolution. The arrangement of the planets in the solar system bear no known relation to their relative size or weight, for though Mercury, Venus, and the Earth follow the same order in size and distance from the sun, yet Mars, which is farther from the sun, is much less than the earth or Venus at their respective distances, which are still farther off, are the least of all. Jupiter, which is next in order, is by far the largest,
being about $\frac{1}{2}$ times as large as all the others together; and, as we proceed farther outwards, we find Saturn less than Jupiter, and Uranus than Saturn, though Neptune, the remotest, is somewhat larger than Uranus.

With reference to their distance from the sun, as compared with that of the Earth, the planets are divided into superior and inferior; Mercury and Venus are consequently the only 'inferior' planets, all the others being 'superior.' The inferior planets must always be on the same side of the Earth as the sun is, and can never be above the horizon of any place (not in a very high latitude) at midnight; they are always invisible at their superior and inferior conjunctions, except when, at the latter, a transit (see SUN) takes place. The superior planets are likewise invisible at conjunction, but when in opposition they are seen with the greatest distinctness, being then due south at midnight. The time which elapses from one conjunction to its corresponding conjunction is called the synodic period of a planet, and in the case of the inferior planets must always be greater than the true period of revolution.

![Diagram showing the comparative sizes of Sun and Planets](image)

**Mercury**, the planet which is nearest the sun, is also, with the exception of the Planetoids, the smallest (being only three times the bulk of the moon), and performs its revolution round the sun in the shortest time. Its greatest elongation is never more than 27°-45°, and consequently it is never above the horizon more than two hours after sunset, or the same time before sunrise; on this account, and from its small apparent size (5° to 13°), it is seldom distinctly observable by the naked eye. It shines with a peculiarly vivid white or rose-coloured light, and exhibits no spots. Its year (or sidereal period of revolution round the sun) is 87-360 days.

**Venus**, the next in order of distance and period, is to us the most brilliant of all the planets. Its orbit is more nearly a circle than any of the others, and when at its inferior conjunction it approaches nearer to the Earth than any other planet. Its apparent angular dimensions thence vary from 10° at the superior to 60° at the inferior conjunction. Its greatest elongation varies from 45° to 47° 12', and therefore it can never be above the horizon for much more than three hours after sunset, or the same time before sunrise. While moving from the inferior to the superior conjunction Venus is a morning star, and during the other half of its synodic period an evening star. When this planet is at an elongation of 40° its brilliancy is greatest, far surpassing that of the other planets, and rendering a minute examination through the telescope impossible. At this period it sometimes becomes visible in the daytime, and after sunset is so bright as to throw a distinct shadow; observers have repeatedly attempted to ascertain the nature and characteristics of its surface, but its brightness so dazzles the eyes as to render the correctness of their observations at best doubtful. From the changes in the position of dusky patches on its surface, which have been frequently noticed, it is concluded that it revolves on its axis, and that its equator is inclined to the plane of its orbit at an angle of 75°; but many astronomers doubt these conclusions. Its year is 224-7 days. Professor Schiaparelli has shown reason for believing that both Mercury and Venus always present the same face to the sun. Both Venus and Mercury necessarily exhibit phases like the moon. For transits of Venus, see Sun.

The Earth, the next planet in order, will be found under its own name; it has a single satellite, the Moon (q.v.). Its year is 365-256 days.

**Mars**, the first of the superior planets, is much inferior in size to the two previous, its volume being about 4th of the Earth's, and, after Mercury, its orbit is much more eccentric than those of the other planets. When it is nearest to the Earth (i.e. in opposition) its apparent angular diameter is 30°; when farthest from it (i.e. in conjunction), not more than 4°. Mars revolves on its axis (which is inclined at an angle of 25° 27') in 24 hours 37 minutes, and its year is 687 days long. In 1877, Hall of Washington discovered that it had two satellites, now named Phobos and Deimos. It shines with a fiery red light, and is a brilliant object in the heavens at midnight when near opposition; when seen through the telescope its surface appears to be covered with irregular blotches, some of them of a reddish, others of a greenish colour, while at each pole is a spot of dazzling white. The red spots are surrised to be land; the green, water; but the markings on Mars appear to have changed considerably since they were first observed. The white spots at the poles are with some reason supposed to be snow, since they decrease when most exposed to the sun, and increase under the contrary circumstances. The Phases (q.v.) of Mars range between full, half, full (in conjunction, if visible), and half.

**The Planetoids.**—After Mars in order come the Planetoids (see below), formerly but improperly called Asteroids.

**Jupiter**, the next in order, is the largest of all the planets, its bulk being more than 1400 times that of the Earth, though, from its small density, its mass is only 300 times. After Venus it is the brightest of the planets and the largest in apparent size, its angular diameter varying from 30° to 50°.
When looked at through a telescope it is seen to be considerably flattened at the poles, owing to its rapid revolution on its own axis; and its surface is crossed in a direction parallel to its equator by three or four distinct and strongly-marked belts, and a few others of a varying nature. Spots also appear and remain for some time on its surface, by means of which its revolution on its axis has been ascertained. Separate spots give, however, slightly different periods (some even opposite one another), but a period of 9 hr. 55 min. 21 sec. is generally accurate. Jupiter has five satellites—the fifth discovered by Barnard at Lieck Observatory in 1892. The four discovered by Galileo, easily observable through an ordinary telescope, have rendered immense service in the determination of longitudes at sea, and of the motion and velocity of light. They were proved by Sir William Herschel to revolve on their own axes in the same time that they revolve round their primary. The smallest is about the same size as our Moon, the others are considerably larger. The year of Jupiter is 4332-554 days.

Saturn, next in position, is about 740 times larger in volume, though only about ninety times greater in mass, than the earth. Its apparent diameter when in opposition is 20°3', and there is a considerable flattening towards the poles. Its surface is traversed by dusky belts much less distinctly marked than those of Jupiter, owing doubtless in great part to its inferior brightness; its general colour is a dull white or yellowish, but the shaded portions, when seen distinctly, are of a glaucous colour. The most remarkable peculiarity of Saturn is its ring, or series of concentric rings, each one parallel and in the same plane with the others and with the planet’s equator. The ring become invisible. Saturn has also no less than eight satellites, seven of which revolve round it in orbits little removed from the plane of the ring, while the eighth, which is the second in size, is considerably inclined to it. They were discovered by Herschel in 1787 and 1789, four by Cassini in 1672 and 1684, one by Huygens in 1655, one by Mr. Russell in England and Professor Bond in America in 1848. The satellites are all situated outside of the ring, and the largest of them is nearly equal in size to the planet Mars. The year of Saturn is 10,759-219 days.

Uranus, the next planet in position, was discovered accidentally by the elder Herschel on 13th March 1781, and was named ‘the Georgian Sidus’ or ‘Herschel,’ but these names soon fell into disuse. It is about seventy-two times greater than the earth in volume, and thirteen times in mass; but, though so large, its distance is so much greater in proportion that astronomers have been unable to gain much information concerning it. No spots or belts have hitherto been discovered on its surface, and consequently its time of rotation and the position of its axis are unknown. It is attended by a number of satellites, but so minute do these bodies appear that astronomers hitherto have been unable to agree as to their exact number; Sir William Herschel believed sixteen of them. One of the astronomers believe in the existence of four, five, and eight respectively. That there are at least four is beyond doubt. The year of Uranus is 30,686-920 days.

Neptune is the next and outermost member of the solar system, and, at a distance of nearly 3000 millions of miles from the centre of the system, slowly performs its revolution round the sun, accomplishing the complete circuit in about 165 solar years. It is about ninety times larger than the earth, but from its extreme remoteness is of almost inappreciable magnitude when seen through an ordinary telescope. It is most remarkable for the disturbances it occasioned by the attractive force of this planet which led Leverrier and Adams to a calculation of its size and position, on the supposition of its existence; and the directions which were given by the former to Dr. Galle of Berlin, specifying its exact position in the heavens, led that astronomer to its discovery on 23rd September 1846 (see AstroNomy). Mr. Russell of Liverpool discovered that Neptune is attended by one satellite. The satellites of Uranus and Neptune differ from the other planets, primary and secondary, in the direction of their motion, which is from east to west, and in the case of the former in planes nearly perpendicular to the ecliptic. Both Uranus and Neptune were observed long before the times of Herschel and Leverrier, but they were always supposed to be stars. Neptune is known to have been observed by Flamsteed between 1690 and 1715, and by Lalande in 1735.

In astronomical tables, almanacs, &c., the planets are for convenience denoted by symbols instead of their names, as follows: Mercury, &; Venus, F; Earth, E; Mars, D; the Planetoids, in the order of their discovery, C, O, D, &c.; Jupiter, V; Saturn, D or S; Uranus, U; Neptune, W or K; the Sun, O; the Moon, M.

MINOR PLANETS. The name given to that numerous group of very small planets which is situated in the solar system between Mars and Neptune. The first minor planet, Ceres, was discovered by Pallas in 1801, and with his success romed his brother astronomers to search for more planets. Their search was successful,

Fig. 2.—Saturn, as observed by Trouvelot with the 26-inch Washington Refractor.
PLANTAIN

Jupiter.

when England (1887) to planetoids spikes, a The 1802 and smaller detection (excepting 1846) has passed without adding to the list. The number known at the beginning of 1851 was 13, of 1861 was 62, of 1871 was 112, of 1881 was 219; in 1898 there were 430. This great success of the astronomers of our time is due to the very minute observations which the zodiacal belt has been explored, and the place and apparent size of every star of this region distinctly determined; so that the presence of a wandering body can at once be detected. Among the most successful of the discoverers of planetoids are those of Pallas of Vienna, and C. H. F. Peters (1813-90) of Hamilton College, U.S. The former, since 1872, has discovered more than 80, on one occasion as many as 5 in a week; while the latter, after 1861, discovered 48.

The magnitudes of these celestial bodies have not been determined with any certainty, that they are exceedingly small as compared even with Merenery, the least of the other planets; the diameter of the largest among them being generally believed not to exceed 450 miles, while most of the others are very much smaller than this. They are also different from one another, being from the rest of the planets in other respects; their orbits are of greater eccentricity, are inclined to the ecliptic at a greater angle, and are interlaced in a most intricate manner, crossing each other so frequently as to form a kind of network. The consequence of this is that a planetoid which is nearest the sun at one part of its orbit is, when at another part of its orbit, farther from it than are several of the others, and a mutual eclipsing of the sun at different times is of very frequent occurrence. The mean orbit of the first 231 planetoids coincides, however, within 30" with that of Jupiter. Of the planetoids of which the elements had by 1891 been satisfactorily calculated, Medusa (No. 149) has the shortest period, 1157-69 days, and Hilda (No. 153) the longest, 2960-92 days. The corresponding mean distances from the sun, expressed in parts of the earth's mean distance, are respectively 2.13275 and 3.90223. Till 1875 the extreme known in this respect were Flora and Sylvia respectively. The nearest approach to the sun is made by Phoecea (perihelion distance, 1.787). Freca recedes farthest from him (aphelion distance, 4.002). Polyhymnia's orbit has the greatest eccentricity, amounting to 0.33985; Lomnia's the least, 0.2176. Massalia's orbit makes a smaller angle—only 41° 7'—with the ecliptic than that of any other planet in the solar system, while the inclination of the orbit of Pallas is no less than 33° 42' 41". After the first two or three of these bodies had been discovered the opinion was pronounced that they were but the fragments of some large planet; and this hypothesis received corroboration from the intimate connection which was shown to subsist among them; but of late years it has fallen out of favour with astronomers, who infer that the planetoids are best accounted for by the nebular hypothesis. It has been calculated that the combined mass of all the planetoids cannot exceed one-fourth of the earth's mass.

For a Table of the periods, distances, size, density, &c. of the planets, see SOLAR SYSTEM. See also PHOTOGRAPHY, and SPECTRUM.

Planimeter, a machine for measuring areas on a plane. The best-known form is that of Professor J. Ansler-LaFfion of Schaffhausen, the theory of which will be found discussed in Williamson's Integral Calculus, and in Minchin's Uniplanar Kinematics. It consists of two rods hinged together. The extremity of the one rod is fixed, so that the free extremity of the other is able to trace out any form of curve, and only in size by the dimensions of the apparatus. The theory of the instrument depends upon the fact that, as the free end is made to trace out the boundary of any closed area, the hinged end oscillates to and fro along a curve, but traces out no area. Rigidly attached to the rod whose one end traces out the plane area is a graduated roller fixed with its axis of rotation parallel to the line joining the hinge and the tracing point. As the closed curve is being described the roller rotates because of the lateral movement of the rod; and the difference of the readings before and after the tracing has been accomplished gives a number proportional to the area that has been gone round. To Ansler-LaFfion also is due a more elaborate form of integrator capable of measuring moments of inertia of areas. It greatly facilitates the calculation of the areas of the planetoids, and curves of stability in naval designing.

Plantage, the surname of an Angvin family which in 1154 succeeded in the person of Henry II. to the throne of England on the extinction of the Norman dynasty in the male line, and reigned till 1485, when the battle of Bosworth gave the crown to the family of Tudor. The name was first adopted by Geoffrey, Count of Anjou, husband of Matilda, the daughter of Henry I., from the ledge of a sprig of broom (planta genista) which he wore in his bonnet; and Henry I. is the only king to whom Mr Freeman would allow the name. The Plantagenet kings were Henry II., Richard I., John, Henry III., Edward I.—III., Richard II., Henry IV.—VI., Edward IV.—V., and Richard III. See the separate articles on these names; also, for the great struggle between its two rival branches, the article ROSES (WARS OF THE). Miss Norgate's England under the Anglo-Saxon Kings (3 vols. 1887) is an altogether admirable history of the Plantagenet period as far as the reign of John.

Plantain. For the tropical plantain (Musa), see BANANA. The English plant so called belongs to the Plantaginaceae or Plantaginaceae, and is the natural order of exogenous plants, mostly herbaceous and without stems; the leaves being in rosettes, flat and ribbed, or taper and greater. Greater Plantain (Plantago major), fleshy; the flowers usually in spikes, and generally hemisphered; the calyx persistent; the corolla hypogynous, membranous, persistent, its limb 4-parted; the stamens four, inserted into the corolla, with
long filaments; the ovary free, of a single carpel, 1—4-celled; the cells containing one, two, or many of the seeds, and surrounded by the ovary walls.

The testa of the seeds abounds in mucilage, which is easily extracted by boiling water. There are about 120 known species, diffused over all parts of the globe, but most abundant in temperate and cold countries. The most important genus is Planainago, the species of which often receive the English name Planainago. Five of this genus are found in the United Kingdom, the chief of which are the following: the Greater Planainago, or Waybread (Planainago major), one of the most common of British plants; a perennial, with broad ovate stalked leaves, and the cylindrical spike, generally set in a spout, and clusters of flowers, broad-spreading, white, and scented. It is very widely diffused over the world. Its seeds are a favourite food of birds, and the gathering of the spikes to feed cage-birds is familiar to every one. The leaves are applied to wounds by the peasantry in many districts. They are said also to be a useful application to ulcers and indolent scrofulous tumours.

—The Rubwort Planainago, or Ribgrass (P. lanceo-
lata), is another very common British plant, forming no small part of the herbage of many meadows and pastures, and sometimes sown by farmers, but with doubtful wisdom. Its leaves are lanceolate and taper at both ends; its spikes are short, ovate or cylindrical, and placed on long angular stalks. Its seed is acceptable to cage-birds. This is the plant commonly known as ‘bullies,’ or ‘sedges,’ the striking off the heads (or spikes) of which is such a favourite amusement of children. —The mucilage of the seeds of P. isophylla and of P. psyllium is much used in India in catarrh and other complaints; and P. psyllium—called Eleavor, and its seeds Fleece— is cultivated in France for the sake of this mucilage, which is used by the natives in preference to that obtained from linseed, and is also extensively used by tallow manufacturers for stiffening their goods. The plant has a branched spreading stem, and recurved leaves.

**Plantain-eaters** (Musophagidae), a family of Pie-like birds, of African distribution, arboreal habits, and vegetarian diet. The species of Musophaga, the Indonesian, the Turaco (Turacnas) are light green with carmine wing-feathers. This occurrence of a green pigment (tuncoverdin), as distinguished from a green colour, is unique among birds, and the carmine pigment (turacin) is also interesting because it seems to be partially washed out in the rainy season.

**Plantation** See ARBOCULTURE. "His Majesty's Plantations" was a not unusual term in the 17th and 18th centuries for the British settlements in America, to which it was customary to transport offenders, political and other, till the American Revolution. See PRISONS.

**Transportation.**

**Plant-houses** are garden structures, designed for the propagation and cultivation of the plants of warmer climates than our own. Apart from the style of architecture, a plant-house must be so constructed as to admit a maximum of light to the interior; there must also be ample provision for ventilation, and means for maintaining such atmosphere as is necessary for the plants that are to be cultivated in it. Glass, wood, and iron are the materials of which plant-houses are made. Masonry is not essential in the erection of plant-houses, but it is very generally employed to give stability, durability, and architectural effect. Glazing material: the larger the amount of it that enters into the structure of a plant-house the better adapted will it be for the cultivation of plants; the means for securing the maximum of light is thereby provided, and its regulation is then under the control of the cultivator.

Under the term plant-house is included every kind of horticultural glass erection employed in the culture of flowering and ornamental plants, as distinguished from those which are devoted exclusively to the culture of fruit-trees or other plants that can be grown solely for the sake of their fruit. They are broadly divided into three classes —viz. hothouse or plant-stove, intermediate house, and greenhouse. The structure of each class may be the same in all respects except in the power of the planting apparatus. In the hothouse it must be adapted for the cultivation of one or two plants; in the intermediate house the heat is regulated irrespective of the temperature of the outer air; in the intermediate house the heat of extra-tropical and temperate countries must be provided; and in the greenhouse all that is required of the heating apparatus is the exclusion of frost or the maintenance of a minimum temperature of 40° F. Hothouses are either dry or moist, according to the class of plants to which each may be devoted; the natives of dry tropical regions and those of maritime lake and river districts severally requiring special adaptations in connection with the heating apparatus. Thus there may be tropical orchid-houses, tropical fern-houses, tropical aquatic-houses—the latter being fitted with tanks of heated water, in which Victoria regia, Nymphaeas, and other aquatic plants of the tropics are cultivated; but the more common class of stove is that in which the internal arrangements are made with the view of accommodating a large variety of plants, having considerable diversity of constitutional requirement. The intermediate house may be subdivided in the same way into the cool orchid-house, the cool fernery, &c.; but more commonly it is adapted to the wants of miscellaneous plants, and very often indeed it is used temporarily for tropical plants during their period of rest, when a lower temperature and less humidity than those of the stove are desirable. The greenhouse must be heated or heated-house, when it is heated by means of glass-cases, for the culture of Cape hens (Erica) and kindred plants, or it may be a New Holland house, if its inhabitants are chiefly composed of the interesting natives of New Zealand, Tasmania, and other temperate parts of Australasia.

The conservatory is a plant-house in which a miscellaneous collection of plants, which, having been grown elsewhere, is placed in order to display the beauty of flowers and foliage. It may be either cool or hot, according to the class of plants accommodated in it. Being usually a place of resort, or a lounge accessible from the drawing-room or some other part of a mansion, its architectural features should be in harmony with those of the building of which it forms a part; but due regard should also be had, in deciding upon architectural details, to the providing of ample light, and the means of securing perfect ventilation. The purpose of a plant-house devoted to the purpose of rearing the several classes of plants indicated in the foregoing, either by seeds, cuttings, grafting, or any other mode that may be required in particular cases. It may be heated or cool, and may or may not be heated. Some of the greenhouses are being more restricted in atmosphere. It is fitted with close glass-cases, fixed or portable, for the purpose of preventing exhaustion, by the atmosphere, of cuttings and other subjects temporarily destitute of roots. An essential feature of the conservatory is the management of the atmospheric humidity. A bed or beds filled with sand, cocoa-nut fibre, or any other clean material, in which the pots containing cuttings may be plunged at will, to prevent evaporation from their sides and fluctuations of
PLANTIGRADES PLANTS

temperature in their contents. These beds are usually provided with hot-water pipes, tanks, or flues below, for the purpose of giving bottom heat when required.

See also FORCING, GARDENING, HOTBED, ORCHIDS, PEACh, VINE, &c.; S. Wood, Forcinc Gardening (1881); Fawcett, Horticultral Buildings (new ed. 1886); Rivers, The Orangery,rew. ed. 1885; May (new ed. 1888), and Williams (new ed. 1883).

Plantigrades. See Bear, Carnivora.

Plantin, CHRISTOPHE, an eminent printer, was born at St Avertin, near Tours, in 1514, and settled as a bookseller at Antwerp in 1549; some six years later he began to print. The books that came from his office are distinguished for their accuracy and beautiful workmanship and finish. His business prospered, and he had often twenty pressmen or more in active operation at once. The most noted of all his publications is the Biblia Polyclogata (8 vols. 1569-73), which was printed under the personal superintendence of Arias Montanus, the court chaplain of Philip II. of Spain. Plantin's editions of the Bible in Latin, Hebrew, and Dutch, and editions of the Greek and Latin classics, are scarcely less celebrated. He died at Antwerp, 1st May, 1589. He had founded printing-establishments in Leyden and Paris, and these, with that in Antwerp, were carried on by the husbands of his daughters. His office in Antwerp remained in the possession of the family of John Moretus, his son-in-law, until it was bought by the city in 1576 for 1,200,000 francs; out of this was created the "Musée Plantin." (1877).

See Life by Max Rooses (in French, Antwerp, 1882); Backer and Uedens, Annales de l'Imprimerie Plantin. (Brussels, 1885); Degorge, La Maison Plantin (4th ed. Paris, 1874); and Correspondence de Plantin (edited by Rooses, Ghent, 2 vols. 1884-86).

Plant-lice. See Aphides.

Plants. It is not possible to frame a complete definition of a plant as opposed to an animal; the most obvious distinction is that a plant is fixed, while an animal moves; and though it is quite true that plants form that kingdom of nature which is called fixed, or hid-between, while the animal life is more vigorous, yet, there are many animals, such as the sea-anemone, which are fixed as a plant; and all plants are sensitive to the sun's rays, and move in response. Nor can we make a formal distinction between them in terms of the food they require, for all animals eat plants, and vice versa. But it is upon simple unorganised materials, the salts and water of the soil, and the carbonic acid and oxygen of the air, and indeed serve as the source of all food for animals, yet there are many parasitic plants which live on the juices of other living creatures. What we do know is, that it is impossible that at the bottom of the ladder of life there are innumerable living creatures which it is a mere formality to call either plants or animals. From such creatures as these it is possible that the two great kingdoms of nature have been evolved step by step in constantly diverging lines. But the diversity of nature of plant and animal life is such that they are mutually helpful to each other; plants having the means of feeding upon the carbonic acid of the air, using the carbon and gas thus formed, and animals, thus forming matter for the life of animals, who in return, by bounteering carbonic acid, help to keep the air in a fit state for plants. This mutual relation of the two kingdoms finds another expression in the aid that insects receive from plants. The insects, after feeding, will oftentimes in their search for honey they become covered with pollen, and carrying it from flower to flower secure cross-fertilisation; while it is probable that the bright colours of flowers have been to a certain extent evolved by nature to seduce the insects who visited them have exerted, by going more often to those of the brighter colour.

For the classification of plants and list of allied subjects, see BOTANY; for their life-processes, see VEGETABLE PHYSIOLOGY; see also the articles AGRICULTURE, BIOLOGY, CULTIVATED PLANTS, FIBROUS SUBSTANCES, FLOWER, GARDENING, and those on the great groups of plants—ALGAE, CONIFERS, CYCADS, Ferns, Fungi, &c.

 Movements of Plants. The movements of plants may be divided into (1) those that take place during growth, including those growths, many of which are common to all plants; and (2) those that may be seen in mature plants—these are rather the exception than the rule. The whole matter is fully treated in the article on Vegetable Physiology (q.v.); here a short and general account will be given.

Growth, in its rate and direction—the direction being really determined by the relative rate of various parts—is influenced by many factors; the effects of temperature, light, gravitation, and moisture are well understood.

Temperature. There is a certain temperature at which growth is most rapid, also a minimum and a maximum at which it ceases; these points are different for different plants.

Light. The formation of chlorophyll and therefore of starch occurs, in nearly all cases, upon light, but that light generally retards growth may be seen by the long stems of plants grown in the dark, and by the bending of plants grown in a window towards the light. In a few cases, as in the older parts of certain stems of the growing parts, this movement is rapid, so as to introduce the so-called centripetal force; the stem will grow towards the centre, that is, in the direction opposite to that of the acting force, and the root away from it, that is, in the direction of the acting force.

Gravitation.—Stems generally grow upwards and roots downwards; that this is an effect of gravitation is proved by the following experiments. Place a seedling in a horizontal position; the growing tip of the stem will turn upwards and that of the root downwards. Rotate a plant slowly in a vertical plane, so as to cause the direction of gravitation to alter constantly; the direction of the growth of the stem is horizontal while the direction of that of the root is vertical, the one moving rapidly, so as to introduce the so-called centrifugal force; the stem will grow towards the centre, that is, in the direction opposite to that of the acting force, and the root away from it, that is, in the direction of the acting force.

Moisture. Stems generally grow in the direction of the greatest moisture. This effect is a stronger one than that of gravitation, for if seeds germinate in a sieve filled with damp sawdust the roots at first grow downwards until they have grown through the sawdust out into the dry air; then the direction of growth changes, and the tips bend round and grow up again into the damp sawdust.

'Spontaneous' Movements of Growing Plants.—There are other movements of growing parts the causes of which are not well understood. Thus, the leaves of a young bud are kept close together, bent over the tip of the stem, by the more rapid growth of their under than of their upper surfaces. When the bud is older the upper surfaces of the leaves begin to grow more quickly than the under surfaces and the leaves unfurl. Such movements are spoken of as mutations. The tips of climbing stems describe a 'circumvolution' due to successive alterations in the rate of growth of the sides of the stem. It is in virtue of these movements that such plants are able to climb by twining round a support. Such movements are further complications (see VEGETABLE PHYSIOLOGY). All these movements are due to unequal growth of the parts of the plants.
The Movements of Mature Plants which we have now to describe are due to alterations in the turgidity of the cells. The existing stimuli of some of these movements is known: it may be contact, light, temperature; in other cases it is obscure, as we have found to be the case with some flowers of gourds. **Contrast.**—The leaves of the Sensible Plant (q.v.) drop when touched or shaken; the stamens of the Berberidaceae, when touched, bend down and come in contact with the stigma. The tentacles of Drosera bend over, and the leaves of Venus' Fly-trap close, when alights upon them (see INSECTIVOROUS PLANTS).

**Light and Temperature.**—Many leaves—e.g., those of Mimosa and Oxalis—move up and down with variations of light and temperature. The sleeping and waking of plants—i.e., the folding of many leaves and flowers at dusk and their opening in the morning—are familiar examples of the effect of variations in external conditions.

**Spontaneous Movements of Mature Plants.**—The leaves of some few plants—e.g., the *Hedyosmum gyrans*—rotate in the dark, while the leaves of *Myriophyllum*, *Trifolium* and *Lupinus* move similarly in the light. These movements are not seen in daylight, probably because they are obscured by the movements due to light. The movements of the leaflets of *Desmodium gyrans* are dealt with at TELEGRAPH PLANT. The plasmodia of *Myxomycetes* creep, bacteria and Diatoms move in a way not yet understood, Volvox swims by means of cilia, the zoospores of *Alga* and the antherozoids of *Mosses* and *Ferns* swim after they have been set free.

**MEDICINAL PLANTS.**—The study of plants with genuine or fancied curative properties is as old as mankind. Even animals seek such medicines, and it must be remembered that our early ancestors were much more familiarly acquainted with fruits and seeds, roots and bulbs than are their more carnivorous descendants. But, while it may be contended that ancient medical treatment was in great part a natural return to more primitive vegetarian diet, it is obvious that men would be quick to profit by a wide and often costly experience of plants with special properties, poisonous and emetic, tonic and narcotic, excitant and sedative. While botanical science is partly responsible for the concentration of its energies on a primitive matter medica, thus, in the writings of Hippocrates (460-377 B.C.) and those to which his name is attached 236 medicinal plants are recorded; the list swells in the works of Aristotle (387-322 B.C.) and Theophrastus (371-286 B.C.), while the 'Materia Medica' of Dioscorides (born in the 1st century A.D.) includes the names and partial descriptions of about six hundred. His work remained authoritative for fifteen centuries, and was continued on the one hand through the herbalists like Gerard and Culpepper in England, and on the other hand through such early botanists as Celsuspinus into the independent—doubtless too independent—science of botany.

In connection with medicinal plants there are many interesting chapters of history with which the student should make himself acquainted—the romantic stories of the old traffic in vegetable poisons; the magicians' use of narcotics and excipients; the mystical doctrine of Signatures (q.v.), according to which plants bore signs indicative of their virtues; the gradual decay of herb gathering and the loss of much valuable information; the record of the old uses of plants in both technical and popular names, such as *Pulmonaria*, *Sanicula*, *Tussilago*, and wound-wort, *serrv-grass*, *goose-weed*; the additions to the British flora by such importations as *belladonna*; the elimination from the modern pharmacopoeia of many vegetable drugs whose value was only fanciful; the relegation of others to the list of simples; the modern discovery or rediscovery of the potencies of *Calabar bean*, *cinchona*, *cochineal*, and many more.


**DISEASES OF PLANTS (Phytopathology).** Scientific investigation of the diseases of plants has not till recently been so widely and systematically followed up as the economic importance of the subject deserves. Our knowledge, therefore, of the causes and of the conditions of disease in the vegetable kingdom is comparatively limited and imperfect. Enough is, however, known to establish the general conclusion that, though there is in many cases a close analogy between the diseases of plants and animals, the causes of disease are very different. Certain bacteria and the allied *Scleromyctes* are recognized as the active agents in the development of disease in animals, parasitic fungi are now regarded as the chief cause of disease in plants. Wet rot in the potato, rot in the bulbs of the hyacinth and the onion, gummosis in the tomato, yellows in the peach, and pink decay in wheat may be cited as the principal diseases of plants at present ascertained to be caused by bacteria.

Parasitic fungi are extremely numerous, and are as varied in their action and peculiar in the parts they affect as they are numerous. Some attack the roots, others the stem and branches, while the flowers and even the several organs of reproduction and the fruit are each liable to be attacked by some particular parasite which induces disease. They are almost always local in their action, and it is very rare to find a case in which the whole organism of a plant is affected in the sense that man and other animals are said to be constitutionally diseased. Instances there are in varieties of cultivated plants of something extremely like constitutional proneness to disease. Certain varieties of *pomegranate* and *tomato* are especially liable to decay in dew, and to become abortive or die of the affection. But such extreme cases are regarded as evidence rather of local or temporary conditions being favourable to an overwhelming distribution of the parasite and the consequent multiplication of the lesions than of the penetration of disease which takes place in the organism of animals on the introduction of a microbe into the blood.

Nor is heredity so generally recognised as a factor in predisposing plants to disease as it is ascertained to be in animals. The tenacity already alluded to in connection with the growth of bacteria is a common evil among plant epidemics. The belief, which is a universal one, that the adoption of a pure and healthy air, and the greater liability of certain varieties of the potato to succumb to disease than others, would indeed appear to be attributable to hereditary predisposition in the individual kind. But it is generally conceded that such peculiarities are indications only of constitutional weakness in the variety, not of any hereditary proneness to disease.

In the suddenness of outbreak and the rapidity with which they spread when they first appear in a country or locality, there is a strong resemblance in some respects to the diseases of animals. And this resemblance is carried further in tracing the subsequent history of notable plant diseases. They appear, like epidemics in animals, to exhaust their extreme virulence after a time. The cases of attack may continue numerous and
Frequent, but the type is less severe, the disease extends, and the fungus disease of 1865 has continued annually in greater or less severity since that time; but from that year, and the two or three years immediately succeeding, it has ceased to be so formidable. Other instances might be mentioned in illustration of this resemblance in connection, for instance, among animals—the vine disease (Oidium), the hollyhock disease (Puccinia malvacearum), the celery disease (P. Apus), all of which made their appearance suddenly with such virulence and widespread rapidity as to threaten extinction of the crop, but, are now sources of neither trouble nor alarm.

The direct action of parasitic fungi in causing disease in plants is through the mycelium or spawn injuring the host plant, either by depriving them of nourishment by impairing their power of assimilation, or by abnormally accelerating or retarding growth. The extent of injury inflicted is extremely variable, in some cases exterminating in degree, and in others, though widespread and general, having little ill effect upon the health of the subject. Adverse climatic and other circumstances—such as unsuitable temperature, excess of dryness or moisture in the air and in the soil, deficiency of light, the presence of deleterious elements in the soil or of noxious gases in the atmosphere—by debilitating the plants render them more liable to attack, especially to the larger of the parasitic fungi.

The effects of disease in plants are extremely various. One of the most common manifestations of the presence of parasitic fungi in the tissues is hypertrophy in the parts affected. This may be either local or general; the roots, the stems, the leaves are all liable to this peculiar disorder. Many of the conifers are particularly subject to hypertrophies in disease. The so-called Cedar-apples of the United States, which occur in great abundance on the branches of Juniperus virginiana, are caused by the spawn of Gynnosporangium macrosporum. They are reniform tumours, and, as has been pointed out by Professor Farlow, originate by the mycelium entering a leaf and growing downward into the bark of the smaller branches. Its presence acts as a source of irritation to the cells. This is followed by the spawn of Metis to which the tree is subject to hypertrophies caused by the spawn of G. clavariiforme. This is frequently to be observed in Britain, and the enlargements are of a very persistent character, and in effect impede the supply of sap to the branches beyond them. Similar tumours occur on the branches of the silver fir, which are caused by the spawn of Pสยdermium clatinum. But the most remarkable example of hypertrophy in connection with the diseases of any of the conifers is that which occurs in the larch disease, which is caused by the spawn of Peziza catalica. The presence of the spawn threads in the cortex, cambium, and woody tissues causes their death; but hypertrophy of the tissues of the surrounding parts is set up. The death and fissuring of the bark of the affected parts follows in due course, the latter eventually dies, and sooner or later the tree succumbs to the disease. There are many other examples of this form of plant disease, nor are they peculiar to ligneous plants, but occur in humble herbaceous parasites, such as the violet, garden strawberry, species of Anemone, ranunculuses, and even in grasses; but space will not permit of more extended notice of particular cases.

Finger-and-toe, 'Anbury,' and 'Chub-root' are the common names given to a disease which attacks the stems of artichokes and to a lesser extent of the important natural order of Cruciferae. It assumes the form of tumours on the roots gener-
by placing the promycoelid spores of the Puccinea (wheat-mildew) on the barberry produced Elyeium berberidis, the mildew which frequently attacks that shrub. Since that time De Bary, Hartig, Plowright, and others have demonstrated that sixty or more species of mildews have a heterocisual habit, and further investigation will doubtless reveal many more.

Cures for plant diseases are as yet empirical rather than scientific. In many cases the subject affected is fatally smitten before evidence of disease is visible. While in what is one of the most common phenomena of plant disease, is the fructification, the final stage, of the parasite. The mycelium, whence the mildew springs, is working its deadly function on the plant in parts which external remedial applications cannot effectively reach.

In many cases of plant disease the affected subject dies without any apparent cause; investigation after death may discover it, but too often also it reveals the fact that our knowledge does not enable us to prescribe a cure. Internal remedies and the means of exhibiting them are yet undiscovered. Some plants are attacked by the mildew—that is, they destroy the pest without injuring the foliage on which it preys—but do not always eradicate the disease. London Purple and Paris Green, both having copper for their base, are very effectual external remedies, but require to be used with caution, as they are dangerous to plant-life. There are many other preparations and compounds obtainable which are more or less effectual in destroying parasitic fungi, but the only safeguard against attack appears to be the maintenance of the plant in perfect health. By this means we will be able to prevent, except it is epidemic or all-pervading, as in the case of the potato disease.

There are separate articles in this work on plant-diseases at Anbury, Enecot,RPannla, Bush, Shurt, and under the names of the plants affected—e.g. Potato; and on the various insect-pests which induce diseases, such as the Aphides and Phylloxera. See also articles on Pesthouse, Rrath, Der Pyrokranken (2d ed. 1886); Frank, Die Krankheiten der Pflanzen (1880); Harig, Lehrbuch der Baume (1882); Costa, Phycotomie Pathologique (1877); J. Pilet, Enzyme (1880); H. Mannert, Ward, The Diseases of Plants (1889); and Professor Plowright in the Gardener's Chronicle for 1891.

PLANT-LORE. Apart altogether from the more or less vague and valueless symbolism, direct or indirect, understood as the Language of Flowers (q.v.), there is an abundant store of traditionary lore associated with all kinds of trees, plants, and flowers. The study of this throws much light on many puzzling survivals in popular folklore, and Mannhardt (1831-80) and Mr. J. G. Frazer have shown its importance for part of the problem of primitive religion. It is not infrequent among Australians and Red Indians to find the Totem (q.v.) taking the form of a plant or tree, and for these reasons some ingenious mythologists have been led to derive from the association between the ancient sacred invidiate wood and the later royal forest—a ludicrous descent from the god to the game-keeper. The oak-worship of the ancient Druids, the sacred fig-tree of Romeus in the centre of Rome, the Ficus religiosa of India, and the sacred groves of the Semitic and pro-Semitic races still surviving at Carthage a century after Augustine are ready examples of tree-worship from sufficiently wide centres of civilization. The primitive mind of the savage readily conceives of a tree as animated by a conscious soul cognate with his own, and he may in his mind form an outward organism or merely its characteristic dwelling-place. Hence trees have their place in the doctrine of fetishism, of idolatry, and the upward development of religion. Buddhists do not include trees among sentient beings possessing inner life, but in their doctrine of the transmigrations of the soul natural in the outward organism of the tree, and Buddha himself was such as often as forty-three times during his transmigrations. The reverence paid to the famous Bo-tree (q.v.) shows how fundamental a fact is tree-worship, which undoubtedly formed a large part of the old indigenous religion amalgamated with the new philosophical faith. But none the less are the sacred trees and grove to be found within the range of Semitic and Aryan influences, and the instinctive revival, even under the shadow of purer rites, of the Cannaanotic Ashera worship proves how deeply they were impressed in the early mind. From all sides we find evidence at once of the great antiquity and uniformity of the worship of trees, whether for the services they render to man, for their venerable antiquity, their form, for particular qualities ascribed to them containing the seeds of fire and fertility, of the life and death of the world, as in the mountain-tops, or for their association with certain phenomena, as plagues and pestilences, or certain events in the history of the homestead. In the growth, life, decay, and death of the plant the primitive man easily sees an analogy to his own, and he may deduce from it the polarity of the death and resurrection of the world; hence the philosophical significance of the widespread rustic rites associated with marriage and with the birth of children. The custom of scattering flowers and the fruits of the field over the footsteps of a newly-married pair conveys an obvious reference to the belief in the transmogrification of plant-life after the death of the individual—the example of animism to which scientific botany has been reduced from a mere tree-soul, both alike regarded as powerful to produce rain or sunshine, to cause fruits to spring and cattle to easily bring forth their young. A still higher generalisation gave a belief in a genius of plant-life or forest-life, or, higher still, a genius of growth or fertility in general. This universal genius of growth was symbolised by a bush or tree, brought in triumph from the forest, gaily decked, and solemnly planted near the homestead or in the village. We have thus seen both the spirit incorporate in the tree, and the spirit mankind with his spirit-world, the spirit of the May, the Old Woman or Corn-mother of German harvest-fields, the Jack in the Green of young London sweeps, and the like. The existence of these Corn-spirits which especially haunted and protected the growing corn we see dimly recognised in characteristic ceremonies of an English harvest home, and in the German custom of leaving the
in which it adopted popular rites of an earlier religion, and subtly rebaptised them as its own. Many remnants of primitive survivals survive in the local English names of plants and flowers, chiefly in connection with the fairies, the devil, and the dead. The Virgin, the rose, and the lily, which have a great wealth of association from one corner of the earth between saints and flowers, as St. Agnes with the Christmas rose, St. Joseph of Arimathaea with the Glastonbury thorn, St. Patrick with the shamrock, the Virgin with the white lily, just as Thor had his oak-tree, Yggdrasil, the Greeks the oak, and the Druids the mistletoe. Again, historical personages and families are frequently associated with particular flowers—it is enough merely to name the orange-lily, the red and white roses, the fleur-de-lis, the planta genista, and the violet. Family and clan crests frequently take this form, as the Sir, holly, juniper; also national badges, as the rose, thistle, shamrock. More curious and interesting, although obscure, are the notions of magical properties connected as persistently with some plant as with others, as with the rue. Most prominent, for instance, among the European folk is the rue, the thorn, and the rowan or mountain-asl; but strange properties are still ascribed to the rosemary, vervain, St. John's-wort, mandrake, asphodel, and to fern-seed; and many flowers lend themselves to the humorous use of iniquities and rites, as for instance in methods of divination. The doctrine of Signatures (q.v.), of such importance in the history of medicine, opens up a special chapter of sympathetic magic, involving the belief that plants bore by nature marks indicating plainly for what diseases they were medicinally useful. The tree of paradise, of Chaldaean and other cosmogonies, the ocarinal oaks of Dodona, those trees of healing spiritually allegorised in the Apocalypse, the trees of Liberty of the French Revolution, and the sacred trees round which an Indian bride and bridegroom walk hand in hand, point unmistakably to a real sympathetic affinity between the human and the vegetable world as did the Dryads, Fauns, and Satyrs of the ancient Hellenic mythology, with their analogues our own elves and fairies of the later Middle Ages. These trees, whose lyre laid its charm on beasts and trees alike, or the Pan at the report of whose death all nature mourned aloud.

See W. Mannhardt, Ropgenmeuhl und Ropgenenhund (Danzig, 1865), Die Korndämmerung (Berl., 1868), Der Baumkultus der Germanen und der Nachbarstämmen (Berl. 1867), Antike Wald- und Feldkulte (Berl. 1877), and the posthumous Mythologische Forschungen (Straßb. 1884); A. de Gubernatis, La Mythologie des Plantes (2 vols. Paris, 1878-82); M. von Stratz, Die Blumen in Sage und Geschichte (Berl. 1875); H. Flammennem, Germanische Erntefeihe im heidn. u. Christl. Cultus (Hanover, 1875); Rev. Hilderic Friend, Flowers and Flower-lore (1884); V. Jahn, Die Deutschen Opferschneuken bei Ackbau und Viehzucht (Breisau, 1870); and J. G. Frazer, The Golden Bough (2 vols. 1890). The last work contains a distinct contribution of the greatest value to a scientific knowledge of the worship of vegetation, but it is not probable that this important theory has been carried too far, and at any rate many of its conclusions remain to be tested by the fresh generalisations of a later day. Its starting-point in the mystical story of the Seraphim in the Apocalyptic book of the Bible, Turner’s picture and the allusion in Macaulay’s Lay of the Battle of Lake Regillus. The lake occupies the site of the ancient sanctuary of Diana Nemorensis. In its grove the priest bore a sacred bough, from which whoever succeeded in breaking off the ‘Golden Bough’ had the right to challenge the priest of the sanctuary to single combat, and, if victorious, to reign in his stead. Mr. Frazer sees in this a survival of the tree-worship of the Druids, as an incarnation of the spirit of the tree, which passed continuously on his being killed into a new and more vigorous incarnation. He finds it also an evidence of
primitive human sacrifice, and identifies the Golden Bough with the mistletoe growing on the oak—the only thing in the world lying hidden in its doom. He has with unequalled learning and ingenuity traced many cognate customs in classical antiquity, as well as parallels in our modern rustic spring and midsummer customs, and finds the same names of vegetables and residues of vegetation under the various forms of the Greek myth of Demeter and Persephone, the Syrian Astarte and Adonis, the Phrygian Cybele and Attis, the Egyptian Isis and Osiris.

Planudes, Maximus. See Anthology.

Planula. See Hydrazoa.

Plaseuca, a decayed town of Spain, in Estremadura, 130 miles W. by S. of Madrid and 43 NE. of Caceres, is surrounded with double walls (1197), has a fine Gothic cathedral (1498), and a pop. of 7000. The monastery of San Yuste, to which Charles V. retired after his abdication, lies 24 miles to the east of Plasencia.

Plasma, a rare siliceous mineral, a variety of quartz or chalcedony, of a dark-green colour, black when unpolished and seen by reflected light, but very transparent when held between the eye and the light. It is very nearly allied to heliotrope or Indian jasper, and has the same compactness, more transparent, and is not susceptible of so brilliant a polish. The name is also used in biology for the simplest form of organised matter in vegetable and animal bodies, out of which the tissues are formed, especially of the blood-plasma. See Blood.

Plasmoplasia. See Cell, Myxomycetes.

Plassey (Pattle), a battlefield on the Bhagirathi River, 50 miles N. of Calcutta. The river has now eaten away the scene of the struggle. Plassey is celebrated in the history of India for the great victory gained by Clive over Suraj ud Dowlah, subahdar of Bengal, 23d June 1757, a victory which really laid the foundation of British supremacy in India. See Clive.

Plaster. See Cast, Gypsum, Building.

Plastering. The art of covering the internal faces of walls, the partitions, and the ceilings of a house or other building with plaster. It is difficult to get plaster to keep completely dry on the inside faces of external walls unless they are first covered with lathing (narrow strips of wood, see Lath). Celluloid and wood are lathed so as to hold or key the plaster. Plastering is sometimes done in two, but most usually in three coats. The first or foundation coat is formed of lime and sand (mortar) mixed with hair. This is called pricking if done upon lath, and rendering if it is spread on a bare brick or stone wall. It is crossed with deep incised lines to key the second coat, which consists of fine lime mixed with some coarse plaster of Paris (see Gypsum) floated on. The first coat should be completely dry before the second is added, but the latter is generally still a little damp when the third coat or set is put on. This last coat is usually composed of a mixture of fine lime, plaster of Paris, and a little size, and is worked so as to produce a very smooth surface. The implements used by the plasterer are chiefly trowels and floating tools, with running moulds for mouldings. Ceiling ornaments and other enrichments are formed of plaster of Paris cast in moulds. Mouldings are run in the same material.

Plaster of Paris. See Gypsum.

Plasters are a class of medicinal agents consisting of adhesive substances, spread upon leather or cloth, so as to stick to the part of the body to which they are applied. The plaster of the British Pharmacopoeia over their adhesiveness either to a combination of oxide of lead with fatty acids, or to the presence of a tenacious resin, or to both. The most important are lead plaster, or diachylin, which enters into the composition of many of the others; resin and pitch plasters; belladonna and opium plasters; mercury and ammoniated mercury and mercury plasters; and cantharides or blistering plaster. Some of the tenaciously adhesive of plasters (not in the Pharmacopoeia) are made with preparations of indiarubber. Court or sticking plaster, for dressing slight wounds, consists of a thin layer of isinglass spread upon silk, and differs from the others mentioned in requiring to be softened with warm water before it will adhere; Goldbeater's Skin (q.v.) is also used for the same purpose. They are employed with two distinct aims—viz. to act mechanically, as by affording artificial support to weak muscular structures, by preventing threatened or actually occurring excoriations, by protecting parts already excoriated from the action of the air, &c. and to act medicinally as counter-irritant, stimulant, diuretic, alternative, anodyne, &c.

Plastilina. See Clay.

Plata. La. See Argentine Republic, La Plata, La Plata (Rio de la Plata).

Plata (Gr. Platian), a city in the western part of Attica, on the borders of Attica, and at the foot of Mount Cithera, 6 miles from Thbes. In 480 B.C. it was destroyed by the Persians, because the inhabitants had taken part with Athens in the battle of Marathon; but in the following year it was the scene of the glorious victory won by the Lacedaemonian Greeks, under Pausanias and Aristides, over the Persian horses commanded by Mardonius. In the third year of the Peloponnesian war (429) it was attacked by a Theban-Lacedaemonian force, and heroically defended itself for more than two years, until it was starved into surrender; the little garrison of about 250 men were put to the sword, and the city was razed to the ground. Such of the Platans as escaped were hospitably received at Athens. By the treaty of Antalcidas (387) their children were allowed to go back again, and rebuild their city, after an exile of forty years; but they were again driven out by their implacable enemies the Thebans; and half a century elapsed before the victory of Philip of Macedon at Chaeronea enabled the Platans to finally return to their homes. After this the city was invested by the Lacedaemonians, 142 B.C. A.D.

Plaques. See Tablelands.

Plate-mark. See Hall-Marks.

Plate-powder, a composition of Rouge (q.v.) and prepared chalk used for cleaning gold and silver plate and plated articles. A gray plate-powder is also sometimes made by levigating quicksilver with twelve times its weight of prepared chalk; it puts a remarkable brilliancy on silver-plate, but is very injurious to it.

Plating signifies the covering of an inferior metal with one of the precious metals, the object being to give the appearance of silver or gold to articles chiefly intended for table use. Previous to the introduction of electro-plating (see Electro-Metallurgy) the method generally pursued was "soldering"—soldering on the borders of a plating-furnace—soldering on to one or both sides of an ingot of the baser metal a thin plate of silver. See also Tin-plate, Galvanised Iron.

Platinotype. See Photography.

Platinum (sym. Pt; atom. wt. 197.4; sp. gr. 21.48 to 21.50) is one of the 'noble metals.' It is found only in the native state, usually occurring in small globules. The plasters of the British Pharmacopoeia owe their adhesiveness to a combination of oxide of lead with fatty acids, or to the presence of a tenacious resin, or to both. The most important are lead plaster, or
except in association with platinum. Sometimes, however, it is found in masses of the size of a pigeon's egg, and pieces weighing ten or even twenty pounds have occasionally been found. It was originally found in the Spanish gold-mines of Darien, but is now chiefly obtained from the Ural Mountains, although it has also been found in Peru, Colombia, San Domingo, California, Oregon, Canada, and Bororo.

There are two modes of obtaining platinum in the form of ingots from the crude native metal, both of which require notice. The earlier method, Occam's, which was used in 1827, consisted in first melting the native platinum by litharge gradually added, and a little glass to act as a flux—to full redness in a reverberatory furnace lined with clay. The sulphur of the galena is oxidised and expelled, and the liquid alloy of lead and platinum is allowed to rest for some time, to allow the lead to precipitate, this is not affected by the preceding operations, to sink to the bottom. The upper portions of the alloy are then decanted, and cast into ingot-moulds, which are submitted to incineration; and the metallic platinum which is left after the impurities is melted and refined in a furnace of lino—_which is employed in consequence of its being a very bad conductor of heat—by means of the oxyhydrogen blowpipe. The platinum obtained in this manner is nearly pure, and very ductile and malleable.

Platinum exhibits a bluish-white metallic lustre; it is exceedingly malleable and ductile, and is very insusceptible, melting only before the oxyhydrogen blowpipe, or in a very powerful blast-furnace, such as that used by Deville and Debay (fusing-point, 1779° C.). It expands less by heat than any other metal, and it is the heaviest of all kinds of metals, with the exception of iridium (sp. gr. = 22.42) and osmium (22.48). It is unaffected by atmospheric action, and does not undergo oxidation in the air at the highest temperatures. It is not acted upon by nitric, hydrochloric, sulphuric, or fluoric acid, or, in short, by any single acid; but in aqua regia it slowly dissolves, and forms a soluble tetrachloride. In consequence of its power of resisting the action of acids it is of great service in experimental and manufacturing chemical processes, platinum spatulas, capsules, crucibles, &c., being employed in every laboratory. Platinum is, however, corroded if heated with the alkalies or alkaline earths, and especially with a mixture of nitrate of potash and hydrated potash, an oxide being formed which combines with the alkaline bases, and constitutes the non-inflammability and the non-oxidisability by atmospheric action, it is in great demand for electrical as well as for chemical apparatus; and the recent introduction of platinotype processes in Photography (q.v.) has caused so great a demand for platinum that its price has come up from about 35s. per oz. in 1880 to 55s. in 1889, and 80s. in 1890.

The form of the metal known as _spongy platinum_ has been already noticed. The metal may, however, be obtained in a state of subdivision much like its native form, by precipitating the acid double chloride of platinum and ammonium—viz. in the state known as _Platinum Black_. In this form it resembles soot. It may be prepared in various ways, of which one of the simplest is to boil a solution of bichloride of platinum, to which an excess of carbonate of soda and a quantity of sugar have been added, until the precipitate formed after a little time becomes perfectly black, and the supernatant liquid colourless. The black powder is then washed with water, washed with water, washed with water, and then dried gently. In its finely comminuted state, either as spongy platinum or platinum black, it possesses a remarkable power of condensing and absorbing gases, one volume of platinum black being able to absorb more than 160 volumes of oxygen. This property is of great importance in the production of certain _oxygenated_ compounds, such as oxygenated petrol (known since 1880 as_ 'divine' _or _oxygenated_ petrol). It was used as an antiseptic and disinfectant in the first world war.

Platinum may be easily alloyed with most of the metals, the alloys being in general much more fusible than pure platinum. Hence care must be taken not to heat the oxides of metals of easy reduction, such as lead and bismuth, in platinum crucibles, as the metal, which is not affected by the crucible, would be destroyed by the fusion of the resulting alloy. An alloy of platinum, iridium, and rhodium is found, by the investigations of Deville and Debay, to be harder and capable of resisting a higher temperature than the pure metal, and hence is admirably adapted for the formation of crucibles, &c.; but it is not now in the market.

There are two oxides of platinum, a protoxide, PtO, and a binoxide, PtO₂. The _sulphides_ and _chlorides_ correspond in number and composition to the oxides. Of these compounds the tetrachloride, PtCl₄, alone requires notice. It is formed by dissolving platinum in aqua regia, and evaporating the solution to dryness; and it is obtained as a deliquescent, reddish-brown mass, which forms an orange-coloured solution in water, from which, on evaporation, it crystallises in prismatic crystals. It is freely soluble in alcohol and ether. A solution of this salt is much used for the recognition and determination of potash and ammonium.

Plato, the great Athenian philosopher, was born during the early years of the Peloponnesian war, most probably in 427 B.C. Diogenes Laertius (q.v.), in his gossipping _Lives of the Philosophers_, and other writers of the Christian era have handed down a considerable amount of detail respecting his life, but most of it is of very doubtful value. An attempt went on, legends gathered round a famous name; and many of the authorities used by Diogenes were in all probability, like Diogenes himself, almost entirely wanting in critical capacity. According to one account Plato was born in Athens itself, according to another in the island of Euboea. He was the son of one Aristocles, and was the nephew of his father Aristo, who was said to be descended from the god Poseidon; whilst the family of his mother, Pericleon, claimed kinship with Solon, and through Solon with Neleus, a son of Poseidon. His namesakes are the double Platos of the Platonic ancestry was not sufficient for the admirers of the 'divine' Plato. Diogenes tells us on the alleged authority of (among others) Speusippus, Plato's own nephew and successor in the academy, that the son of his uncle, the Platonist, was that his real father was Apollo, and that the god appeared in a vision to Aristo, who thereupon kept away from his wife till her child was born. Plato's
birthday was celebrated on the same day (at the end of May) as that of Apollo himself. Bees from Hymettus are said to have fed the infant with their honey. Plato was originally named after his mother, named Theone, and his philosopher-king teacher is said to have called him 'Platón,' because of his broad shoulders, though others say he got this name from the breadth of his forehead. There is a story that he wrestled at the Isthmian games. He cannot well have escaped military service during the hundred years of the Peloponnesian war. In youth he is said to have written poetry, and this we can easily believe: a few epigrams in the 'Anthology' are ascribed to him. With regard to his philosophical education we have the important testimony of Aristotle (Metaph. i. 6), that from his youth he had been familiar with Cratylus, a follower of Heraclitus, and that the other philosophic influences under which he came were those of Socrates and of the 'Italics' schools—i.e. Pythagoreans and Eleatics.

Critias (afterwards one of the 'Thirty Tyrants') was regarded as Plato's and his brother's first disciple. His youth was passed amid the disasters and failures of the Athenian democracy; and the martyrdom of the teacher who had inspired him would not tend to increase his sympathy with that form of government. After the death of Socrates he seems to have stayed some time at Megara, where Eudoxus, who had been one of the Socratic circle but belonged also to the Eleatic school, had established himself. Eudoxes developed the Eleatic philosophy in the direction which Zeno ("the father of logic") had begun. He was the man, after Aristotle's time, who was to be considered logical questions. His school was known as the 'Dialectical' or 'Eristic'—i.e. 'disputatious.' This sojourn at Megara was doubtless an important stage in the development of Plato's thought. Having left his native Megara, he seems to have travelled to Athens in 384 (he is said to have taken part in a Corinthian campaign, or whether he did not return to Athens till ten or twelve years after the death of Socrates. During this period of his life he is said to have undertaken extensive travels, and to have visited Cyrene, Egypt, Italy, and Sicily. The visit to Sicily is almost certain; visits to the Magi and the Persians, the Babylonians, and the Hebrews are undoubtedly fictions of a later age, which supposed that wisdom could only come out of the Orient. The Athenians of the time of Dionysius in Syracuse probably helped to suggest the pictures of the tyrant in the Republic and Gorgias. On his way back from Sicily Plato is said to have been seized by order of Dionysius and said as a slave in Aegina, but to have been ransomed by a certain Areus. The residence of Athens has been variously assigned to the years 389 and 387. Plato now began to teach in the Academy (g.v.), a place of exercise in the western suburb of Athens, planted like a grove, and named from the hero Academus. There and in his own garden, which was adjacent, he gathered round him a band of disciples, teaching them probably, like his master Socrates, mainly by conversation, and embodying the results of his thinking and teaching in his written dialogues. Two more visits to Sicily interrupted the quiet of these later years. Soon after the death of the elder Dionysius (369 B.C.) he was summoned by Dionysius the tyrant of Syracuse to become his philosopher-king, in the hope that he might convert the younger Dionysius to philosophy, and so realise the dream of a philosopher-king. The young despots welcomed him warmly, but soon became weary of serious discussions, quarrelled with Dion, and finally had him put to death. This task was not less task. A third journey to Sicily (about 361) was undertaken in the vain attempt to reconcile Dionysius to Diom. Plato's own life, it is said, was only saved from the tyrant by the intercession of the Pythagorean Archytas. On his return to Athens (360) he again resumed his teaching and writing, till, after a peaceful old age, he died 'in his eighty-first year' at a wedding-feast (347). He was succeeded in the Academy by his brother's son, Speusippus; but his greatest disciple was Aristotle, who must have come under his influence after the return from the second Sicilian voyage.

Of Plato's philosophical writings none apparently have been lost; but along with undoubtedly genuine works there have come down to us others whose authenticity is open to question. Thrasyllus, a scholar of the time of Augustus and Tiberius, concluded the 36 dialogues traditionally ascribed to Plato to be genuine, rejecting a few quite unimportant writings as spurious. This 'canon of Thrasyllus' probably represents the tradition of the Alexandrian library. Aristophanes, one of the Alexandrian librarians (about 264 B.C.), had arranged similar dialogues by Plato according to the groups of three, following the analogy of Attic drama. Plato himself suggests at least two such trilogies—viz. Republic, Timaeus, Critias (unfinished); Sophist, Statesman, Philosopher (never written). Thrasyllus adopted an arrangement in tetralogies, making nine groups of four, only one of which groups (viz. Euthyphro, Apology, Crito, Phaedo) which gives a connected picture of the trial, last days, and death of Socrates) is anything but extremely artificial. Grote accepts all the works in the list of Thrasyllus. To others it appears that the Alexandrian library had every means of obtaining a genuine collection of Plato's writings from his successors in the Academy; but almost all other modern scholars reject the Epistles, some of which may, however, be very early forgeries. And the authenticity of the works that are not commonly admitted—especially in the case of the Translations, the Marcus Aurelius, and the Diodorus—are of a question. Fortunately, the more important works are the least open to question. We have Aristotle's statement that the Laches were written by Plato after the Republic. Beyond that we can only conjecture the order in which the dialogues were written; and the hypotheses of different scholars have varied greatly. We may safely put aside the theory of Schleiermacher (with whom the modern critical study of Plato begins), that Plato quite early in life had formed a complete system of philosophy in his mind, and that the dialogues were published by his disciples in order intended to unfold this system gradually to the world. It would be more true to say that Plato never had any completely formed system, and during a long life of speculation his opinions must have undergone modification. We cannot, indeed, without some difficulty, follow our author's order in his attempts to prove them. The dialogues are divided into series representing exactly his mental development (as K. F. Hermann and others have attempted); but the student may most probably consider them in groups, suggested by the different influences that act upon him, and especially by his changing attitude towards the teaching of Socrates. Each of all would come those short dialogues in which is so far as we can judge by comparing him with
Xenophon, Plato does not go beyond what the actual Socrates might have said. Such are the dialogues which deal with some particular virtue; the Protagoras, Socrates questions the beautiful and modest youth Charmides as to what the virtue of modesty or 'temperance' is. In the Laches he questions the soldier Laches about courage. The most important of this group is the Protagoras, in which Socrates argues against this follows: Xenophon says that it is not identical with knowledge. Some of these slightly dialogues may have been composed before the death of Socrates; Diogenes Laertius tells us that Socrates on hearing Plato read the Lysis (which deals with friendship) said: 'O Herocles! what a lot of lies the young fellow has told about me.' Ancient tradition made the Theaetetus the earliest dialogue; but this almost certainly belongs to a later period, though earlier than the Republic. The Apology, or 'Defence of Socrates on his Trial,' has probably more historical accuracy than any other composition of Plato's (Plato tells us he was present at the trial), and may have been written soon after the death of Socrates. The Euthyphro (concerning piety) and the Crito (Socrates in prison) may belong to the same period. The Phaedo, however, even though a conversation on the immortality of the soul, is probably of later date, as it implies the theory of ideas, and may be assigned to a time after Plato's visit to Sicily—i.e. after he had come more strongly under Pythagorean influences. Some modern scholars, having given greater stress on the 'Mystic influence,' assign the great metaphysical dialogues (Por- menides, Theaetetus, Sophist, Statesman) to the time between 399 and 386, when Plato began his teaching at the Academy. Others, with more probability, consider these dialogues and the Philebus to belong to the school's later period of thought, and this opinion is gaining ground. The Theaetetus, Symposium ('Banquet'), Gorgias, Republic, Phaedo, in which (along with the Theaetetus) Plato's literary skill is at its very highest, may perhaps be all assigned to the period of his life after forty, but on his own showing. In his own comments on his own characters ascribed to Socrates are probably represented with historical and, at least, with dramatic truth; but theories are introduced which betray strong Pythagorean influences. We must also bear in mind the theory as to beauty, that there is not 'sensation' (or 'perception'), as Protagoras and his followers suggest: sensation alone gives us no objective certainty, valid for every one. Nor is it 'opinion.' Opinion may be true, but has no certainty. A man only 'knows' when he has got at the reasons or causes of things, when he sees facts not in an isolated way, but connected by the 'chain of causation' (Mēnēa): he must be dealing with what is permanent and universal. What then is this? Plato's answer comes to be found in the theories of the Ideal or 'Form,' or 'integer' 'form,' or 'shapes,' and so 'kinds.' The analogy of sculpture may help one to understand how the Greeks came to regard 'the form,' in contrast to the 'material,' as the essential element.) This theory, following Aristotle's guidance, we may consider a development of the Socratic 'universal conception,' and also of the Pythagorean doctrine of 'numbers.' By this theory Plato seeks to reconcile the opposing views of the Heracliteans and of the Eleatics (q.v.). According to the Heracliteans, one, the universe is the manifold, the changing, have their place in the universe, the former in the world of ideas, the intelligible world, with which 'science' deals, the latter in the world of sense, with which mere 'opinion' is content. In the Republic Plato elaborates this theory of knowledge: we have a symbolical representation of it in the famous image or 'myth' of 'the Cave.' The majority of mankind are pictured by him as prisoners in a subterranean cavern, chained with their backs to the fire, looking up the rocky wall and mistaking them for realities. The turning round of some of these prisoners to the light, and the timid ascent up the steep slope to the mouth of the cave, and the gradual training of their eyes bewildered in the sunlight to see the real things in the upper world, and finally to look
The Timaeus is the one work which Plato has devoted to the philosophy of nature; and though it has exercised directly and indirectly an enormous influence over science and philosophy, as it has so largely attracted mystical and theosophical commentators, in Plato's own view it occupies a very subordinate position. We are again and again warned by him not to expect strict truth, but only approximations and figurative statements. He knew that the notion of 'emotions,' which plays so great a part in later philosophy is latent in the Timaeus. The Cosmos, or order of the universe, is the 'one only-begotten' image of God, its father and creator (Demiurgus—i.e., artificer). The Creator was good, he could not not make the world as good as himself; but no created or visible thing can be perfect. The material out of which the orderly world is made introduces imperfection into it. (This conception of matter as evil had a potent influence in later times, especially when combined with Oriental ideas—e.g., in Gnosticism, &c.) So, too, the eternal Creator could not make the world eternal like himself, and in making it made Time, the 'moving image of eternity.' To the obscure details of Plato's cosmology and physics it would be unprofitable to refer here. Cosmology is again partly introduced by a group of ideas (the Latin equivalent of Plato's 'ideas'). But the philosopher must not remain in the region of the various special sciences: he has the passion for unity and universality. Plato has a vision of the true science which is above all particular sciences, and is the unity and 'coincidence' of a special science, and this he calls in a special sense 'dialectic,' which does not like mathematical thinking need the help of sensible images, but deals with 'ideas' alone in their relation to one another and to the highest of all, the 'idea of the god.' These ideas are not mere concepts of our minds: they are, in Plato's phrase, 'the most real existences.' The extreme form of mediaeval 'Realism,' according to which universals are prior to and more real than particular things, is a crude version of Plato's doctrine. It is indeed an adaptation of Platonist philosophy to Christian teaching for which Plato's system provides no account, if the ideas are called 'the thoughts of God,' but the phrase is perhaps less misleading than many others which have been used about them. Plato does speak (in Republic, x.) of God having 'made' the ideas, as a human artist makes things by imitation of them, but he is then talking in pictorial language. God in Plato's system is rather the 'idea of the good,' the good-in-itself, which is the cause alike of knowing and of being, as the sun in the visible world is the cause both of light and of life. In the Timaeus the world is said to be fashioned by the Creator or Artificer after the pattern of the ideas; but here also the language is figurative. Plato's 'ideas' must, however, be thought of both as 'real kinds' and as archetypes. Plato's presentation of his theory varies: most probably the theory itself underwent much modification. Parmenides was one of the objections made to it are the same as were afterwards urged by Aristotle—a remarkable instance of a philosopher criticizing himself. The relation of the hierarchy of the ideas to the phenomena of the gods as conceived by Plato has worked out by Plato. Dialectics remains only a ideal science. The true dialectician is he who will see things in their unity (compare Mr Herbert Spencer's definition of philosophy as 'completely unified knowledge'): he will also 'divide things rightly according to principles.' The highest faculty of philosophy is a bringing together and a dividing (synthesis and division). In this we may recognise the germ of Aristotle's 'induction and deduction.'
(‘Righteousness’ would perhaps be a better word) is not the virtue of any special part, but of the whole soul, and is defined as ‘every part doing its own work and not interfering with the others.’ To arrive at the nature of Justice (the professed object of the discussion) the Platonic Socrates has turned from the Supreme to the latter letters—i.e. from the individual to the state, where human nature can be seen ‘writ large.’ Wisdom is the virtue of the rulers, Courage of the warriors, Temperance or Moderation is the harmony resulting from the obsequity of the lower to the higher, and Justice, which is the whole state, that the whole state would require a special ruling caste, and the only true rulers in Plato’s opinion are philosophers. Plato allows that there may be ordinary virtues resulting from custom or right opinion (cf. Meno and Phaedo), but the higher type of conduct must be bound up with the highest type of knowledge. Those alone who have the philosophic nature (which is sometimes described by him as the passionate love of truth) are the proper rulers in a perfect state, and in the philosophic nature all virtues are contained. Socrates, the Areopagite, (the parent of so many ‘Utopias’), besides the paradox of the philosopher-king, the other paradoxes by which Plato startled his contemporaries were (1) that men and women should have the same education and the same pursuits, and (2) that the whole state should be turned into one family with the family abolished. All things were to be in common; and the breeding and rearing of the citizens was to be entirely under the control of the philosopher-rulers. Just as in his theory of knowledge Plato’s ideal is unity, so his political ideal is that the state should be as much as possible one, one as a family is, or rather as one individual is. All are to be ‘members of one body.’ Some of the features in Plato’s ideal state were doubtless suggested to him by the Pythagorean brotherhoods, many of them by the actual institutions of Sparta. In fact, Plato’s ideal state might be described as a combination of philosophy with Spartan military discipline. Without the philosophy we have an inferior form—the Spartan state, or ‘tyranny,’ in which not philosophy but military honour is the ruling principle: and the ruling principle is vacuity. Lower still is democracy, the equality of good and bad alike; and worst of all is tyranny, the rule of the ‘wild beast element in man.’ In the Statesman Plato gives a beautiful analysis of political conditions, recognising both a better and a worse form of democracy, and placing both below aristocracy, but above oligarchy: in the true state the number of the rulers matters not, if only they have ‘the science of ruling.’ In the Laws he elaborates a second-best state, giving up communism as too difficult of attainment, and proposing a complete equalisation of property. In the Laws also he praises ‘mixed government.’

In the earlier part of the Republic Plato discourses on the principles of justice, turning the discussion from the Hesiod to the Greek ‘Bible,’ but Plato objects to much in the poets and in the popular religion as false and immoral. Music and poetry should be simple (here again the complex, the manifold, is of the nature of evil), and should imitate only what is good, hence dramatic art is digressive and objectionable. Towards the end of the dialogue he goes further, and objects to all ‘imitation,’ whether in painting or in words, as being only a copy of the so-called real things, which are themselves only a copy of the truth itself—the true beauty and so drives the poets from his ideal state. Aristotle’s Poetics may be regarded as in part a ‘Defence of Poesy’ against Plato’s criticism. Why, it has often been asked, has Plato, himself so great an artist, dealt so Puritanically and so unsympathetically with art? Partly, perhaps, because the first steps in reflection about art, as about religion, imply a certain withdrawal from the sway of that to which is to be criticised and understood. But the Republic gives only one side of Plato’s thought on art. In the Symposium (in which the bungling Pan-plebeian praise Love in turn) and in the Phaedrus ‘the beautiful’ occupies the same place that ‘the good’ does in the Republic. Plato is after all a true Athenian, and thinks of the good under the form of the beautiful. ‘Beautiful-and-good’ is the Greek equivalent of ‘beautify’ (in which the bananas show its best sense). ‘All that is good is beautiful,’ he says in the Timaeus. The true lover is akin to the philosopher, and loves the beauty of the soul rather than the beauty of the body, and ascends from the love of the many beautiful to the love of absolute beauty. There is indeed a strain of asceticism in Plato’s view of life; but there is none of the Cynic contempt for the beauty of the human form and for the graces of social intercourse. In the Phaedo Socrates speaks of the body as ‘the prison-house of the soul.’ The question is somewhat different from Socrates awaiting his end: and in the Republic the body has to be carefully trained that it may be a fit servant of the soul, and the young are to grow up amid fair sights and sounds.

Plato’s influence on human thought has been even more widely diffused, but is more difficult to measure than that of Aristotle. The various schools of the Old, Middle, and New Academy played their part. Scepticism was assimilated into Stoic, especially the later Stoics, borrowed much from him. Perhaps no school of Greek philosophy was unaffected by him. In Alexandria Jewish thinkers fell under his fascination (see Philo); and Christian theology is largely Platonic. But the Alexandrian Platonists and the Neoplatonists (q.v.) differ from Plato himself in making the Timaeus the centre of his system. The writings ascribed to Hermes Trismegistus and Diogenes the Areopagite belong to the Neoplatonic period. The latter was translated by Eriugena in the 10th century, and Platonism reached the western world in the middle ages through the medium of those mystical writers. The Italian Renaissance and the revolt against Scholastic Aristotelianism revived the study of Plato’s own writings; but the enthusiastic Cambridge Platonism of the 17th century were both after the Neoplatonic manner, and, like the medieval ‘Aristotelianism,’ brought more veneration than understanding to the interpretation of the philosopher. Of all Plato’s disciples (to adapt a famous saying) perhaps only one had understood him—Aristotle—and he did not. His criticisms are often strangely unsympathetic. Yet Aristotle’s whole system gives a more trustworthy clue to Plato’s real philosophical significance than the state of the art from mystical interpreters whose zeal was not always according to knowledge (see first edition).

The first printed edition of the Greek text of Plato is the Aldine (Venice, 1513). Plato is constantly cited according to the pages of the edition printed by H. Stephanus (Paris, 1578). The best and most convenient texts are those of Stallbaum, of Baüer, Orelli and Winckelmann, and of K. F. Hermann. The critical edition by S. Taylor (1845) is not yet complete. Plato was first printed in the Latin translation by Fideno (Flor., 1483), which was the best outcome of the Platonic revival, and is the basis of the ordinary Latin versions. A complete English translation and a new critical text by Taylor, ‘the Platonist’—i.e. Neoplatonist, in 1804 (including nine dialogues translated by Sydenham about 1759). The poet Shelley translated the Symposium (included
Platte, or Nebraska, an alluvium of the Missouri River, is formed by the junction in west central Nebraska of the North and South Forks, which rise among the Rocky Mountains, in Colorado, are respectively some 800 and 550 miles long, and are not navigable. The general course of the Platte is eastward, in a wide shallow valley, over the treeless plains of Nebraska, till it reaches the Missouri after a winding course of about 450 miles. With its forks it drains some 300,000 sq. m., but like them it is not navigable.

Platten-See. See BALATON.

Plattsburg, capital of Clinton county, New York, on Lake Champlain, at the mouth of the Oswegatchie or South Fork; 31 miles N.W. of Montreal. It has planing-mills, machine-shops, and an iron-foundry, and manufactures wagons and sewing-machines. In Plattsburg Bay, on September 11, 1814, a British fleet of sixteen vessels was defeated and partly captured by Commander Thomas Macdonough, with fourteen vessels; while a large land force, under Sir George Prevost, was repulsed by General Macomb, with 1500 men. Pop. 8434.

Plattsburg, capital of Cass county, Nebraska, is on the Missouri, about a mile below the mouth of the Platte, and 21 miles by rail S. of Omaha. It manufactures flour, wagons, engines, reed-organ, &c. Pop. (1890) 4107; (1896) 4904.

Plautus. See ORNITHORHYNCHUS.

Plauen, one of the most important manufacturing towns of Saxony, stands in the south-west corner, on the Elster, 78 miles S. of Leipzig by rail. Its chief industries are the manufacture of cotton goods, muslin, cambric, jacenet, and embroidered fabrics, with a in secondary degree cigars, paper, machinery. Pop. (1875) 28,756; (1896) 46,988.

Plautus, M. Accius (or more correctly T. Maccius), the chief comic poet of Rome, and probably among his own countrymen the most popular Roman author of any age, was born about 250 B.C. at Sarsina, a village in Umbria, a district which must at this time have been thoroughly Latinised. We have no knowledge of his early life and education, but it is probable that he came into Rome while still young, and acquired there his complete mastery of the most i:olatric Latin. Though born in the country, he introduces countrymen chiefly as subjects for ridicule; he always writes as a townsman, familiar with city life, especially among freemen, craftsmen, and the middle classes. In Rome he found employment, education, and, at the stage, of what kind precisely we do not know. In this position he saved money enough to enable him to leave Rome and start in business on his own account in the way of foreign trade; and such early thrift shows strong character and determination to rise in the world. His plays evince close familiarity with seafaring life and adventure, and an intimate knowledge of all the details of buying and selling and keeping accounts—experience probably acquired during this period. We know that he failed in business, and returned to Rome in such poverty that he had to earn his livelihood in the service of a laker by turning a hand-mill, work generally performed by slaves. At this time, shortly before the second Punic war broke out, he was probably about thirty years of age, and while in this humble condition he began to write those plays which he sold to the managers of the public games. The price paid him enabled him to leave the mill, and he spent the rest of his life at Rome. Probably he commenced to write about 224 B.C., and for forty years, until his death in 184, he continued to produce comedies with wonderful fecundity. Most of the plays we have belong to the last ten years of
his life. It is not certain whether Plautus ever obtained the Roman franchise. He was the contemporary of Nemesius and of Ennius.

His plays appear not to have been published during his lifetime, but to have been left in the hands of his friends and admirers. The critics have been prone to correct and omit passages to suit them for the stage. Almost all the prologues were written after his death. About 130 plays were attributed to him in the time of Gellius, who held most of them to be the work of earlier dramatists, revised and improved by himself. They contemned them almost as spurious. Varro in his treatise Questiones Plautianae limited the genuine comedies to twenty-one; and these so-called 'Varronian comedies' are the same which we now possess, only one, the Epidicus, being lost. Plautus' plays were immensely popular on the stage, not only with the people, but with the educated classes, and were acted, as Arnobius tells us, in the time of Diocletian, five centuries later. Plautus borrowed his plots to a large extent from the New Attic Comedy, which dealt with ideal life to the exclusion of politics; he doubtless imitated its general types of character, but he 'adapted' very freely, and infused into his borrowed framework a new and robust life, which was Roman to the very core. His perfect spontaneity, vivacity, and wit attracted all Italy. If his dialogue shows that these are the genuine fruit of his own genius. The scenes of his comedies are always laid in Athens or in some Greek town. Had he depicted the family life of Romans so corrupt, the magistrates would no doubt have interfered; but the Greek personages of his plays speak and act in every respect like Romans; they refer familiarly to places in Italy, to streets, magistrates, and customs at Rome. Not even Shakespeare is more careless about inconsistency of this kind. It is probable that Plautus wrote with great rapidity; some of his finest comedies are written through the action being too hurried to the close. Roman comedy expressed 'a rebound from the severer duties of life'; Plautus' audience were in holiday mood, and did not expect to be admonished or entertained with a display of reflection. His leading characters possess boundless animal spirits, infinite resource in difficulty, and but small conscience. His heroes show that, as Sellar says, Plautus was more familiar with the ways of 'Bitterness' than of Roman ladies. His favourite slave, whom he makes a noble youth, shows himself the slave Tyndar, cheerfully willing to sacrifice all for his young master, shows that Plautus had the power to conceive a really noble character. The charm of Plautus, lying in his genuine humour and powerful grasp of character, even deep down to the roots of his nature; he delights his readers to-day as truly as when he made Roman theatres ring with applause, or when St Jerome solaced himself in his cell by reading the well-loved comedies. His joyous sense in all circumstances of the gladness of life is the mark for all time of his master, he makes his reader look involuntarily at the bright side of things. According to Sellar, the five best plays are Aulularia, Captivi, Menæchmi, Pseudolus, Rudens. Shakespeare has imitated the plot of the Menæchmi, entirely recasting it, in his Comedy of Errors. Molliere's L'Avare is borrowed from the Aulularia.

English translations are by Thornton and Warner (1767-74), and H. T. Riley (1860). Ritchie has shown great acuteness in restoring Plautus' text, which is very corrupt (2d April 1771). The complete edition which he contemplated was continued by his pupils, G. Goets and others (1878 et seq.). See also Sellar, Roman Poets of the Republic.

Playfair, John, mathematician and natural philosopher, was born at Benvie manse, near Dundee, March 10, 1705; he succeeded his father as minister of Liff and Benvie. During his leisure hours he still prosecuted his favourite mathematical and geological studies, and communicated to the Royal Society of London two memoirs, On the Arithmetic of Impossible Quantities and Account of the Lithological Survey of Schiehallion. In 1783 he became joint-professor of Mathematics in Edinburgh University, but exchanged his chair for that of Natural Philosophy in 1805. He became a strenuous supporter of the 'Humean theory' in geology, and, after publishing in 1802 his Illustrations of the Humean Theory of the Earth (see GEOLOGY, Vol. V. p. 148), he made many journeys for the sake of more extensive observations, particularly in 1815, when he visited France, Switzerland, and Italy. The last volume of his works, published in 1819, Playfair was during the last part of his life secretary to the Royal Society of Edinburgh. From 1804 he was a contributor to the Edinburgh Review and to the Transactions of the Royal Society of Edinburgh, and wrote many important articles for the Encyclopaedia Britannica. His separate works are the Elements of Geometry (1795) and Outlines of Natural Philosophy (1812-16).

Plays. See DRAMA, THEATRE. A relic of the censorship of the press survives in Britain in the licensing of stage plays. By an Act of 1843 no plays may be acted for hire till they have been submitted to the Lord Chamberlain, who may refuse to license them in whole or in parts; the official who reads them for this purpose being the 'examiner of stage plays.' A penalty of £50 attaches to the offence of acting an unlicensed or prohibited play; and the theatre in which it is represented forfeits its license. In the United States these laws are generally inoperative; the authorities have power to forbid the representation of plays which they consider to be harmful to morality.

Plea, the answer of the defendant to the plaintiff's demand or charge. Pleas were divided formerly into pleas dilatory (where the party seeks to break down the conclusion of the action without entering into the merits of the case) and peremptory, Demurrers (q.v.), in Abatement (q.v.), special in bar, &c.; now the plea is usually Guilty or Not Guilty (see CRIMINAL LAW). In Scots law, plea means also a written statement of the legal grounds on which the party bases his case. In English civil procedure this is called Pleading; a term applied in criminal law to the accusation of the prosecutor or the answer of the accused. Pleadings have been much simplified by the Judicature Acts (1873-78). In the United States the New York legislature established a uniform procedure which has been adopted by most of the states. 'Plea of the Crown' is an old term for criminal cases. In the Houses of Parliament pleading, as in the superior courts of law, must be conducted at the Bar (q.v.).

Plebeians. See ROME, TRIBUNE.

Plebeiscite, the name given, in the political phraseology of modern France, to a decree of the
nation obtained by an appeal to universal suffrage. Thus, Louis Napoleon was chosen president, and subsequently emperor, by a plebiscite, and in 1870 obtained the sanction of still a third one (75 million votes). The word is borrowed from the Latin, but the plebiscitum of the Romans properly meant only a law passed at the Comitia Tributa,—i.e., assembly of the plebs, or 'commons,' as distinguished from the nobles. The word is often used in Britain for an attempt to secure an expression of opinion on some special point of national interest by all the inhabitants of a district—often by means of return post-cards.

Plectognathi, an order of Bony Fishes (q.v.).

Pledge. See Pawnbroking.

Pleiades, in Greek Mythology, were, according to the most general account, the seven daughters of Atlas and Pleione, the daughter of Oceanus. Their history is differently related by the Greek mythologists: according to some authorities, they committed suicide from grief, either at the death of their father or of their countrymen, or at the fate of their father, Atlas (q.v.); according to others, they were companions of Artemis (Diana), and, being pursued by Orion (q.v.), were rescued from him by the gods by being translated to the sky; all authorities, however, agree that after their death or translation they were placed in the sky among the constellations. They are, from left to right, Electra, Maia, Taygete, Alectryone, Celene, Sterope (the invisible one), and Merope. The group or constellation of the Pleiades, called the 'Seven Stars,' is placed on the shoulder of Taurus, the second sign of the Zodiac, and form, with the pole-star and the twin Castor and Pollux, the three angular points of a figure which is nearly an equilateral triangle. But, if looked at directly, only six stars are visible to the eye, though, if the eye is turned sideways, more can be seen; a good telescope shows fifty or sixty in the area. The photographic chart produced by M. M. Henry in 1888 shows 2320 stars, with nebula internixed.

The name Pleiads is frequently applied to reunions of poets in septenary groups; and this use of the word dates from the time of Poleney Philosophus at Alexandria, who treated seven Greek poets with some special attention and denominating them Pleiads. His example was followed by Charlemagne. But the name Pleiads is specially associated with a group of 16th-century French writers, of whom Ronsard (q.v.) and Du Bellay (q.v.) are the most notable, who endeavoured with marked result to reform the French language and literature after classical models. The other names are Lazzar de Balé, ambassador at the diet of Spires; Jean Dorat, a celebrated Hellenist; Amadis Jamin; EtienneJobelle; and Pontus de Thiern. In place of the two last, other authorities give Scévole de Saint Martin and Marc Antoine Maret (q.v.); and instead of Jamin, Beliace.

Pleiocene. See PIocene.

Pleochroism. In some crystals, such as some specimens of topaz, three distinct colours may be observed on looking through them along three rectangular axes. In intermediate directions intermediate tints may be observed; and this property is that of pleochroism or polychroism. In some other cases a similar range of intermediate tints may be observed, lying between two extreme tints visible along two axes (dichroic crystals—e.g., olite or sapphire d'eau, and some specimens of mica).

Plesiosaurus. See PLESIOSAURUS.

Pleistocene (Gr., 'most recent') or Glacial. See GLACIAL. The glacial epoch is the later of the older accumulations belonging to the Quaternary or Post-Tertiary division. Almost all the molluscs met with in beds of this age are existing species. The system is termed Pleistocene or Glacial according as we have reference to the character of its organic remains or to the physical conditions under which the greater part of the deposits have been formed and is related. These deposits are of very diverse nature and origin, and are subject to endless modifications, but nevertheless they show certain well-marked phases which are persistent over wide areas. Thus, throughout all northern Europe and the hilly and mountainous districts of the central and southern regions of the continent they exhibit the same general character and succession. The deposits of these regions consist for the most part of glacial and fluvioglacial detritus, which betoken the former presence of a great ice-sheets in northern Europe, and of extensive snowfields and glaciars in the mountain districts farther south. For an account of these deposits and glaciation generally, see GLACIAL PERIOD. In the regions outside of the glaciated areas the Pleistocene system is represented principally by fluviatile accumulations, enlaced into valley and mountainous, and deposits in caves. The old river-gravels, &c., are well seen in the valleys of southern England, France, Belgium, central Europe, Spain and Portugal, Italy, &c., where they occur at the surface. But when they are followed into regions in which glacial and fluvioglacial accumulation is well developed they disappear underneath or are dovetailed with them. Cave-deposits are of course met with even in glaciated regions, but in such countries no Pleistocene accumulations overlie the glacial and fluvioglacial detritus of the latest cold stage of the glacial period.

Thus, in general terms, the Pleistocene deposits of northern Europe and the mountainous regions of the central and southern parts of the continent are of glacial origin, while the accumulations outside of those areas are chiefly fluviatile. The latter were for some time believed to be upon the whole younger than the former, but the two series are now generally recognised to be contemporaneous. The occurrence of fossiliferous beds intercalated between sheets of morainic matter (boulder-clay, &c.) proves that the so-called glacial period was interrupted, and there were, though short, interglacial climatic conditions, during which the inland ice of the north retired from all the low grounds, while the great glaciers of the Alps, &c., shrank back to the inner recesses of the mountains. The organic remains obtained from fresh-water interglacial deposits in northern Europe (often termed Loess,) &c., have not only occurred in the river-accumulations of the non-glaciated tracts, and the result is that these accumulations are now admitted to be for the most part of interglacial age also. In short, the peat, river-deposits, tufs, and cave-accumulations are the equivalents in time of the glacial and interglacial deposits.

Life of the Period.—The plants and animals of the Pleistocene betoken great changes of climate—certain species indicating an extremely cold or Arctic climate, whilst others could only have flourished under extremely mild and uniform conditions. While a cold climate prevailed, such plants as Dryas octopetala, Betula nana, Salix polaris, &c., flourished in the plains of Germany, and similar northern and Arctic forms clothed the low grounds of Swithland and the north-east of England, the elder, larch, spruce, juniper, and yew, while in Northern Italy the Cambric pine flourished in the neighbourhood of Juvra, and the Scotch fir on the shores of Lake Varese, positions in which it is needless to say they could not live now. Contemporaneous with these forests flourish many fresh-water shells which are equally indicative of cold and unguinal conditions. And the same tale...
is told by the boreal and Arctic species of molluscs which occur more or less abundantly in the shelly clays of north Germany, Scandinavia, and the British Islands, and by the presence of northern forms in the Pleistocene marine beds of the Mediterranean area. The character of the land animals is quite in keeping with the evidence. Living in the low grounds of central and southern Europe at this time were reindeer, glutton, musk-sheep, Arctic fox, Alpine hare, marmot, snowy vole, mammoth, woolly rhinoceros, &c. The remains of these and several other animals are met with both in glaciated countries and in the caves and fluviatile deposits that occur in regions that never were covered with glacier-ice. The relics and remains of man himself also accompany the same flora and fauna. In strong contrast with such an assemblage of plants and animals is that of which we find abundant traces in interglacial beds and cave- and river-deposits. In northern France grew willows, hazels, ash, dwarf elder, sycamore, spindle-trees, hazels, clematis, sycamore, inachairos, i.e., &c. During the interglacial period, which flowers in winter, proves that the winters must have been very clement, and the other plants are indicative of a genial humid climate. The summers were not so hot and dry as they now are in France, and the dry-land and dry-forest conditions obtained in Germany and the Mediterranean region—although the forms of those different zones were distinguished from each other by the presence of certain forms and the absence of others. The land and fresh-water shells associated with this flora are equally indicative of genial conditions, and similar evidence is supplied by the mammalia. Thus, we find a strange commingling of southern and temperate forms which is quite in keeping with the similar association in one and the same place of various plants which no longer live together. We find hippopotamus, African elephant, hyena, serval, lion, leopard, various extinct species of elephant and rhinoceros, an extinct dwarf hippopotamus and macracterus. Contemporaneous with these were urns, black, brown stag, stag's, muntjac, roe, wild cat, wild boar, brown bear, grizzly bear, cave bear, Irish deer, &c. The relics and remains of Palaeolithic man likewise accompany this flora and fauna.

It is obvious, therefore, that the Pleistocene period was marked by great climatic oscillations. At one time the whole of northern and north-western Europe, down to the 50th parallel N. lat., was covered with a vast mer de glace, while from the Alps and all the considerable mountain-ranges of middle and southern Europe great glaciers descended to the low grounds. From ice-sheet and glaciers mighty rivers flowed all the year round, but in summer they rose in flood and inundated wide tracts, which in time became overspread with sand and loam. It was under such conditions that a boreal and Arctic vegetation clothed the interglacial plains of Europe. Considerable tracts of that region, during the last cold stage of the glacial period, appear to have resembled steppe, and to have been inhabited by jerboas (jumping hare), spermophiles, &c. The same lands, which is quite in keeping with the even, beaver, hazel, rabbit, other mammals, wild cat, wild boar, brown bear, grizzly bear, cave bear, Irish deer, &c. The relics and remains of Palaeolithic man likewise accompany this flora and fauna. 

With the advent of interglacial times such ungenial conditions of climate passed gradually away—the ice-sheet vanishing from the low grounds of north-western Europe, while the mountain-glaciers of central and southern regions dwindled to insignificance. Great migrations of plants and animals accompanied these changing conditions, the Arctic-alpine flora and northern and alpine fauna retreating northwards and retiring to mountain elevations. At the climax of interglacial times an extremely mild and genial climate, recalling that of the Pliocene, prevailed in Europe. The Canary laurel, the figs, and citrus plants, the juniper and other hardy shrubs, &c., grew as far north as Paris, in which region frost in winter was rarely or never experienced. Elephants, hippopotamuses, rhinoceroses, &c., and vast herds of bovine and cervine animals then wandered over all temperate Europe—the British area included. How often such changes of climate were repeated has not yet been ascertained, but interglacial beds occur on at least two horizons—as in France and the alpine lands of central Europe. Hence there would appear to have been at least three glacial epochs and two intervening epochs of genial climatic condition. In northern Europe only one well-marked interglacial epoch is generally admitted by geologists. But the evidence is not conclusive. It is obvious, indeed, that the preservation of interglacial accumulations of organic matter and other relics would have been severely glaciated. With the return of ice-sheet and glaciers, fluviatile and other deposits which had been laid down during interglacial times would be ploughed up and commingled with other morainic material. It is only here and there, therefore, that patches of such deposits have escaped destruction. The relics of interglacial times are most abundantly met with in countries which were beyond the reach of the ice. The closing stage of the Pleistocene was a glacial one; so that in the valleys of central and western Europe, off the oesiferous river-valleys of the last interglacial period are more or less buried under the fluvio-glacial gravels and loams of the latest glacial epochs. The latest Pleistocene deposits in the British area are marine clays containing Arctic and boreal shells. These deposits go up to 100 feet or so in Scotland.

Considerable geographical changes supervened during Pleistocene times. The proofs are seen in certain raised beaches in the maritime districts of north-western Europe, in the marine clays with their Arctic and boreal shell-sand, in the sands and loams of the Mediterranean, &c., of glacial and interglacial age, which are well developed in the British area. Again, the distribution of the mammalian fauna of the Pleistocene points in like manner to considerable changes in the relative level of land and sea. Thus it would appear that in interglacial times Europe was connected, across the Mediterranean, by one or more land passages with north Africa; while at the same time the British area was continental. Indeed, certain evidence leads to the belief that the English Channel was not interglacial sea as what is now the line of 100 fathoms. Towards the close of the last interglacial epoch, however, a considerable submergence of the British area supervened—for undisturbed interglacial shells, &c., have been met with up to depths of several hundred feet. It is noteworthy also that the low grounds of north Germany were likewise submerged just before the invasion of that region by the last great mer de glace. The cause of such changes of level has been much canvassed by geologists, and that the reindeer and its associates flourished in the low grounds of southern France, where they were hunted by Palaeolithic man. With the advent of interglacial times such ungenial conditions of climate

The text continues without any apparent breaks or errors in formatting.
the weight of the great ice-sheets which covered such vast regions in our hemisphere during glacial times may have displaced the earth's centre of gravity, and thus caused a rise of the sea in the north. Others, again, think it probable that under the influence of the great thick crust may have yielded and sunk down more or less gradually. Some, again, have thought that a thick ice-sheet would exercise sufficient attraction upon the sea to cause it to rise upon the land. It must be admitted, however, that some of the observations in this, which take place in Pleistocene times were on much too considerable a scale to be explained by any of the hypotheses referred to. If, for example, the considerable subsidence which happened just before the advent in the British area of the last mer de glace was due to the pressure of an ice sheet covering some region farther north, it is hard to understand how great confluent glaciers afterwards succeeded in covering an area lying several hundred feet below the surface of the sea. Again, if the crust of the earth were so readily deformed under the weight of the ice sheet, it is difficult to account for any of traces of contemporaneous marine action in these low-lying regions of south England and the Continent which were invaded by the great northern ice-sheet? Whatever influence the ice-sheets of the glacial period may have had upon the submerged areas near the coast, the greatest oscillations were the result of considerable earth movements, such as have taken place at many different stages of the world's history.

Pleistocene in other Continents.—In North American deposits of the same character and showing the formation as a great theatre of Europe's encountered—the glacial and interglacial conditions that characterised the latter continent having been equally characteristic of the former. The Pleistocene fauna of North America embraced Mastodon, a true elephant, species of horse, buffalo, moose, peccary, bear, &c., and gigantic extinct forms of sloth, such as Megatherium, Mylodons, and Megalonyx. In South America the Pampa deposits have yielded a large number of remains of the great sloths and armadillos (Glyptodon), besides a great variety of other species. There is abundant evidence to show that snow-fields and glaciers had in Quaternary times a considerable development in the Cordilleras, while in Punga ice seems to have overflowed much of the low grounds. In South Africa the ancient snow-fields and glaciers have left their traces in the mountains of the Drakensberg and Kravernaun. Again, New Zealand and Australia seem to have had a glacial period. Little is known of the mountains of central Asia, but old moraines and erratics have frequently been observed in the Chinese ranges, while, as is well known, the glaciers of the Himalayas had formerly a very great development.

Cause of the Pleistocene Climatic Changes.—Many speculations as to the cause of the climatic changes of Pleistocene times have been indulged in. It must be admitted, however, that none of these explanations is without its difficulties. But the theory that change in, or change of position, accounts for the facts and has gained the widest acceptance is that advanced by the late Dr Croll. According to him, the strongly contrasted climates of the Pleistocene period were the indirect result of the increased eccentricity of the earth's orbit, combined with the precession of the earth's axis. The increased eccentricity that hemisphere which had its winter in aphelion would be subject to severe cold, and its snows would not disappear during the succeeding short summer, the temperature of which would be lowered by its absence. Thus the winters of the hemisphere would be subjected to severe glacial conditions. In the opposite hemisphere the state of things would be very different, for the winter would be short and mild and snow would not accumulate. Under such widely contrasted conditions between the northern and southern hemispheres, the trade-winds, and through them the great convective movements of water, would be fully affected. The winds blowing from the glaciated hemisphere would be much stronger than those coming from the other, and the equatorial oceanic currents would thus be impelled across the equator into that hemisphere whose summer happened in aphelion. If a warm current of warm water would necessarily increase the temperature of that hemisphere, while the other would have its temperature correspondingly lowered. Owing to the procession of the equinox, however, the conditions of the two hemispheres would tend to be reversed every 11,000 years or so; so that during a cycle of great eccentricity each hemisphere would experience an alternation of extremely cold and very genial climatic conditions. The last period of high eccentricity commenced some 240,000 years ago and lasted for about 160,000 years. Some geologists have stated that the glacial period cannot be carried so far back in time. Thus, from an examination of the rate of erosion in the postglacial gorges of some rivers in North America (Falls of Niagara, Falls of St Anthony), some observers conclude that only 7000 or 8000 years have elapsed since the change of the ice age. But in all such measurements and estimates there are elements of uncertainty which render the conclusions based upon them of little value.

Antiquity of Man in Europe.—All the human relics met with in Pleistocene deposits belong to what is known as the Palaeolithic stage. Hitherto no incontestable evidence is forthcoming to show that man was an occupant of Europe before the glacial period. It is quite possible he may have been, but we lack evidence sufficient to prove this. He certainly lived, however, during the glacial and interglacial conditions described above. It is remarkable that no trace of his occupation has been met with in beds of later date than those pertaining to the close of the last interglacial epoch. If we were to judge from negative evidence (which is abundant), we might infer that he vanished from Europe during the last glacial epoch. The oldest human relics hitherto discovered in postglacial beds are Neolithic.

See Croll's Climate and Time (1875). Various objections which have been levelled against his theories have been answered by its author in his Climate and Cosmology (1886). See also G. F. Wright, The Ice Age in North America (1889), and the articles in this work on Geology, Anthropology, Man, Europe, Stone Age.

Plenipotentiary. See Ambassador.

Pleiosaurus (Gr. plesios, 'near to,' sauros, "a lizard"), the type or leading genus of a family (Pleiosauridae) of fossil sea-reptiles, which are characteristic of the Mesozoic systems. The skull of Pleiosaurus is small and depressed, with a shallow mandibular symphysis. The teeth (sink in distinct sockets) are long, slender, and cylindrical, and show fine longitudinal ridges on the enamel. The most striking peculiarity of the vertebrae is the great length of the neck portion, which was composed of 24 to 28 vertebrae, the anterior ones being generally very small. The cervical vertebrae consist of a centrum, neural arch, and two ribs, which are firmly articulated to the centrum of the vertebra, the terminal faces of which are more or less be cumulative. In the dorsal vertebrae the ribs are much elongated, forming a long neural arch; and in the tail they gradually descend again to the sides of the centrum. The tail is
much shorter than in Ichthyosaurus (q.v.). In the abdominal region the extremities of each pair of ribs are connected below by the development of the hemal spine. The sesamoids are of moderate size and widely separated. The two pairs of limbs correspond closely in structure. The humerals and femurs are comparatively short and distally much expanded; the radius and ulna, tibia and fibula are short and flat; the 'hand' and 'foot' are long, the phalanges being increased in number beyond the normal complement. The limbs were covered with integument so as to form simple undivided paddles, as in the turtle. Plesiosaurus was undoubtedly aquatic, and probably haunted the shallow seas and estuaries of Mesozoic times. Its remains have been met with frequently in a fine state of preservation, some almost perfect skeletons having been obtained from the Lias of England. Several genera of Plesiosaauridae have been determined. One of these, Clinocephalosaurus, met with

in the Jurassic and Cretaceous strata of Europe, North and South America, and New Zealand, attained a length of between 30 and 43 feet. Pliosaurs was another genus, with a shorter neck (the vertebrae twelve in number) and a comparatively larger head than Plesiosaurus. In this genus the lower jaw was sometimes nearly 6 feet long. See the Manual of Palaeontology, by Nicholson and Lydekker (1899).

Plesiis-les-Tours. See Tours, Louis XI.

Plethom, Georgios Gemistos, a Greek scholar, was most probably a native of Constantinople, and found employment in the Peloponnesus under the 'despots' Manuel and Theodore Paleologus. He was sent as a deputy to the council held at Florence in 1439, and here, if he did little for the union of the Eastern and Western Churches, he did much to spread a taste for Plato. He returned to Constantinople, and died there about 1455. See vol. i. of F. Schultze's Geschichte der Philosophie der Renaissance (Jena, 1874).

Plethora (Gr., 'fullness') designates a general excess of blood in the system. It may arise either from too much blood being made or from too little being expended. The persons who become plethoric are usually those in thorough health, who eat heartily and digest readily, but who do not take sufficient bodily exercise, and do not duly attend to the action of the excreting organs. With them the process of blood-making is always on the increase, and the vessels become more and more filled, as is seen in the red face, distended veins, and full pulse. The heart is excited and overworked, and hence palpitation, shortness of breath, and probably a sleepy feeling may arise; but these symptoms, instead of acting as a warning, too often cause the abandonment of all exercise, by which the morbid condition is aggravated. The state of plethom thus gradually induced may be extreme without any function being materially failing, and yet the subject is on the verge of some dangerous malady, such as apoplexy, or structural disease of the heart or great vessels, or of the lungs, kidneys, or liver.

Pleurisy, or inflammation of the investing membrane of the lung (pleura), is one of the most serious diseases affecting the chest, but by no means invariably, associated with inflammation of the substance of the lung, commonly known as Pneumonia (q.v.). Pleurisy without pneumonia is much more common than pneumonia without pleurisy. When both are present, but pneumonia preponderates, the correct term for the affection is pleuro-pneumonia, although it is frequently spoken of simply as pneumonia, probably in consequence of the remedies being applied mainly to it, as the more important of the two elements in compound malady.

The pleura being a serous membrane, its inflammation is attended by the same course of events as have been already described in our remarks on the two allied diseases, Pericarditis and Peritonitis. The inflammation is of the adhesive kind, and is accompanied by pain, and by the effusion of serum, of fibrinous exudation, or of pus into the pleural cavity. In the last case it is called empyema. In consequence of the anatomical relations of the pleura—one part of the membrane (the parietal) lining the firm walls of the chest, while the other part (the visceral) envelopes the soft and compressible lung, and these opposite surfaces being freely movable on one another—it follows that very different effects may be produced by its inflammation. For example, the visceral layer may be glued to the parietal layer, so as to prevent all gliding movement between them, and to obliterate the pleural cavity (similarly to what often happens in Pericarditis, q.v.); or the two surfaces which are naturally in contact may be abnormally separated by an effusion of serum between them; or, from a combination of these results, the opposite surfaces of the pleura may be abnormally united at some points, and abnormally separated at others.

The general symptoms of pleurisy are rigors, pain in the side, fever, difficulty and rapidity of breathing, cough, and an impossibility of assuming certain positions; and of these the most marked is the pain or stitch in the side, the Point de côté of the French writers. The pain, often very severe, and often limited to one small spot, is usually at the lower part of the affected side; but is occasionally felt in other parts—as in the shoulders, in the hollow of the arm pit, beneath the collar-bone, along the breast-bone, even in the loins, simulating lumbago; or, in the abdomen, so as to suggest peritonitis or hepatitis. In some cases it is altogether absent. The pain is increased by percussion, by pressure between the ribs, by a deep inspiration, by cough, &c.; and the patient is often observed never to draw more than a short and imperfect inspiration. Cough is not invariably present, although it is an ordinary symptom. It is small, suppressed as far as possible by the patient, and is either dry or accompanied by the expectoration of slight catarrh. If much frothy mucus is brought up it is a sign that Bronchitis (q.v.) is also present, and the appearance of rust-coloured spuma indicates the co-exist-
ence of pneumonia. Although the above-named symptoms, especially when most of them occur together, afford almost certain evidence of the existence of pleurisy, yet to the physician the physical signs are still more valuable, especially those that distinguish between the acute and chronic phases of the disease.

The friction-sound, characteristic of pleurisy in the dry stage in its most marked form, resembles the cracking of leather; the patient is often himself conscious of the grating sensation produced by the rubbing of the pleural surfaces; and this may sometimes be heard by the hand laid on the affected part. If fluid effusion be present the friction-sound is lost; but dullness on percussion replaces the normal resonance over the area which it occupies.

Pleurisy far more commonly arises from exposure to cold than from any other cause, especially if a poisoned condition of the blood, predisposing to inflammation of the serous membrane, is present; thus it often complicates rheumatic fever and Bright's disease; but it may be occasioned by mechanical violence (as by a penetrating wound of the thorax, or the splintered ends of a broken rib, &c.), or by the accidental extension of disease from adjacent parts. The disease may terminate in resolution and complete recovery; or in adhesion, which often only causes slight embarrassment of breathing; or it may end with such a retraction of one side of the chest as to cause the corresponding lung to become barren or totally useless; or it may cause death either directly by actual suffocation, if the effusion is very copious, and is not removed by tapping, or indirectly, by exhaustion. It is seldom that simple pleurisy proves fatal; but empyema in adults is a less rare event.

In the treatment of pleurisy rest in bed, careful nursing, and light diet are essential. In acute cases in the early stage cupping, leeching, or blistering is generally indicated. When effusion has taken place, purgatives, diuretics, and absorbents should be given. But when fluid is present in large amount and is not diminishing from day to day, it is usually desirable to draw it off by tapping. If the thuid be serous this usually greatly hastens recovery. Even when it is purulent (empyema) aspiration, repeated when necessary, is the best treatment. In the case of children with empyema more especially, in adults, free anti-septic opening and drainage of the cavity alone affords any hope of cure.

**Pleurisy Root.** See Butterfly Weed.

**Pleurodynia** is the name sometimes applied to neuralgia of the chest-wall, which may simulate closely the pain of pleurisy.

**Pleuronecrosis.** See Flat-Fish.

**Pleuronecrosis.** The disease of this name in the human subject is not mentioned at PLEURISY; the following article deals with the disease in cattle so called. Pleuronecrosis Contagi- osa is a contagious febrile disease peculiar to horned cattle, supposed to have originated in central Europe and thence to have been conveyed to all parts of the world. It cannot be certainly traced further back than 1769, when it was known in eastern France as Morie. Not till 1802 was it seen in Germany, 1824 in Russia, 1841 in Great Britain and Ireland, 1843 in the United States, 1853 in Australia, and 1864 in New Zealand. It is a disease which produces a large number of cases, though the system by the lungs, and which, after an incubative period of from two or three weeks to as many months, induces extensive inflammatory exudations in the substance of the lungs and surfaces of the pleura, finally resulting in consolidation of some portions of the lungs, occlusion of the air-tubes, plugging of the blood-vessels, and, generally, adhesion of the pleural surfaces.

It is now clearly demonstrated that pleuro-pneumo- nia never occurs independently of infection, that it is not fostered by overcrowding, exposure, wet, damp, dirty hovels: these influences may predispose an animal to succumb more readily, or, in other words, to become more susceptible, to a disease produced by the specific organism to which undoubtedly the disease is due, as stated by the writer in 1886. He stated that the organism was a micrococci. It has since been discovered that there are three kinds of micrococci—viz. 1st, pneumococcus guttae cerei, whose colony consists of little hard, yellow, or reddish-orange drops of wax; 2d, pneumococcus lichen- oides, which grows in a thin white layer; and 3d, pneumococcus flavescens, whose colonies are elongated or round in shape, and assume a beautiful orange tint. In addition to these cocci a bacillus is found, called by Arling the pneumococulis liquefaciens, and supposed by that observer to be the pathogenic organism causing the disease.

There is much variety in the manifestation of the disease. In some instances, especially during its first stages, it runs a rapid course, destroying life in the course of a few days; in other cases, and these are the most numerous, its onset, course, and termination occupy a period of from two to eight weeks, or even longer; some animals recovering after the shorter periods, whilst others linger and at last die. In either case, the disease is characterized by the presence of an exhausting diarrhoea, imperfect aeration of the blood, hydrothorax or water in the chest, and the depressing influence of degenerated animal materials absorbed into the blood, and anaemia. The more prominent symptoms are slight rigors or shivering, elevation of temperature, an appetite, secretion of milk diminished, an occasional cough is heard which is dry and hard in character, rumination becomes irregular, the bowels rather constipated, and the urine is scanty and high-coloured. In cases that do not begin to recover in this stage the signs of putrefaction increase more or less rapidly; the cough becomes more persistent, the respiratory movements increase in frequency, when the animal stands the elbows are turned out, and whilst recumbent the weight of the body is thrown upon the sternum, the breathing is dyspneic, the diaphragm, in anatomical conformity of this bone, the animal can most readily expand the chest. The breathing is often but not always accompanied by a moan or grunt resembling the bleating of a goat.

Experience has led the great majority of professional men to the conclusion that the disease is not influenced by medicinal remedies; it runs a course. If the dose of the contagium is small, or the animal able to withstand a larger one, it terminates spontaneously in apparent recovery; but an animal which has thus apparently recovered still contains the germs and products of the disease, and remains a source of danger to others for an indefinite period, probably during the remainder of its existence. If, on the other hand, the dose of the specific cause be strong or the animal weak, death follows in cases in which, owing to the anatomical conformity of this bone, the animal can most readily expand the chest. The breathing is often but not always accompanied by a moan or grunt resembling the bleating of a goat.

**Inoculation.**—Experience and successful inoculators have shown the practicability of inoculating with carefully selected lymph—and the non-success of the operation has been proved to be due to a careless selection of the inoculating fluid, and ignorance on the part of the operator—exerts a preservative influence and invests the economy of animals subject to its influence with an immunity which protects them from the contagion during a period not yet determined. Lymph for inoculation should be
removed as soon as possible after the slaughter of an animal not too severely affected with pleuro.

It should be a very light straw colour, the palette the better, and free from all blood and frothy mucus. It is the usual practice to collect the sweat by means of a covered cistern, collected with a porcelain spoon rendered aseptic, and conveyed into vials containing pieces of worsted thread a few inches long, which, as well as the bottles, have been aseptised. One of these worsted threads is inserted, by means of a needle made for the purpose, under the skin of the tip of the tail of each animal. Incision is practised to an enormous extent in Australia, many stock-owners there now believing that but for this it would be impossible to rear cattle successfully.

Plevna, a town of Bulgaria, 19 miles S. of the Danube that this KY. of Sofia, all with a 14,574 by 1834. Here in 1877, Osman Pasha, the Turkish general, after defeating the Russians in several engagements, entrenched himself against their reinforced and superior numbers early in September, and repulsed their advances to take the place by storm by giving an unsuccessful attempt to cut his way through the investing Russian army, he was compelled, provisions and ammunition running short, to capitulate (10th December) with 42,000 men and 77 guns. The siege cost the Russians 55,000 men, the Romanians 10,000, the Turks 30,000. See W. V. Herdber, The Defence of Plevna (1895).

Pleximeter. See Percussion.

Pleyel, Ignaz Joseph, born 1st June 1757 at Ruppersthal, near Vienna, studied under Haydn and in Italy, and in 1783 was made Kapellmeister of Strasbourg Cathedral. In 1791 he visited London, and he harmonised many of Thomson’s songs. See Thomson’s Collection of Scottish Songs. At Strasbourg, during the French Revolution, he barely escaped with his life as a royalist. In 1793 he opened a large music shop in Paris, and in 1807 joined thereto a phonoforte manufactory. He died in Paris, 14th November 1831. His compositions consisted of quartets, concertos, and sonatas.

Plea Polonica is the name given to a disease of the scalp, in which the hairs become matted together by an adhesive and often fetid secretion, and which is especially prevalent in Poland, although it occasionally occurs in other countries. It appears to be of very long standing, to be infested with a fungus of the genus Trichophyton. The only treatment that is beneficial is the removal of the hair, and strict attention to cleanliness; but, as it is popularly believed in Poland, some portion of the hair on the head by way of all other sickness and misfortune, it is often difficult to persuade patients to have recourse to these means.

Plimsoll, Samuel, ‘the sailors’ friend,’ was born at Bristol on 10th February 1824. In his seventeenth year he became clerk in a Sheffield brewery, rose and to a position of trust in the firm. In 1834 he started business on his own account, in the coal trade, in London. Shortly afterwards he began to interest himself in the sailors of the mercantile marine, and the dangers to which they were exposed. He accumulated a mass of facts proving that the gravest evils resulted from the wilful employment of unseaworthy ships, from overloading them, and under-manning them, from bad stowage, and from over-insurance; unscrupulous owners insured rotten or ‘colli’ ships at a value greatly in excess of their real value, trusting the mortgagees to sell them to sea, hoping they would found, by which means they would make bigger profits than they could make by legitimate carrying of merchandise. Failing to induce parliament to take legislative steps to put an end to these evils, Mr Plimsoll himself entered parliament, for Derby, in 1868; but it was not until he had published Our Seamen (1873) and had made an appeal to the general public that he succeeded in getting passed the Merchant Shipping Act in 1878, to ensure temporary measures passed during three preceding sessions. By this act the Board of Trade was empowered to detain, either for survey or permanently, any vessel deemed unsafe, either on account of defective hull, machinery, or equipment, or improper loading, or overloading, or unsound rigging or nationality not entitled to British registry, and inquired by any owner who should ship a cargo of grain in bulk exceeding two-thirds of the entire cargo, grain in bulk being especially liable to shift on the voyage; the amount of timber that might be carried as deck cargo was defined, and enforced by penalties; finally, every owner was ordered to mark (often called the ‘Plimsoll Mark’) upon the sides of his ships, amidships, a circular disc, 12 inches in diameter, with a horizontal line 18 inches long drawn through its centre, this line and the centre of the disc to mark the maximum load-line—i.e. the line down to which the vessel might be loaded, in salt water. Failure to comply with this last regulation exposed the owner to a fine not exceeding £100 for each offence. In 1890 this act was amended, the fixing of the load-line being carried out by a nominated board and made a duty of the Board of Trade. Mr Plimsoll retired from parliamentary life in 1880. But he did not slacken his efforts to make the sailors’ calling safer: in 1890 he published a work on Cattle-ships, exposing the cruelties and great dangers connected with the shipping of live cattle across the ocean to British ports. He died 3d June 1893. See Japp, Good Men and True (1890).

Platinin, or Pliny Latimus, a large mountain-mass (2469 feet) of Wales with three summits, on the boundary between Montgomery and Cardigan, 16 miles W. of Llandinillo. The name is said to be a corruption of a Celtic word signifying Five Rivers, five rivers having their sources on its slopes; one is the Severn, another the Wye.

Plinth, the square member at the bottom of the base of a Column (q.v.). Also the plain projecting band forming a base of a wall.

Pliny (Gaius Plinius Secundus), called the Elder, to distinguish him from his nephew, came of a North Italian family and was born in the Comum (Come), where he was born 23 A.D. He claimed to be a compatriot of Catullus, but the reference is too vague to warrant the assumption that their common birthplace was Verona. His education was carried on in Rome, under every advantage of wealth and family connection, till, when about twenty-three years old, he entered the army, serving on the staff of L. Pontinus Secundus, then conducting a campaign in Germany. He became colonel of his regiment (a cavalry one), and while attending enough to his military duties to make a special study of the throwing of missiles from horseback, on which he wrote a treatise (De Jaculatione Equestri), and to compile a history (afterwards published in twenty books) of the Germanic wars, he gratified his thirst for miscellaneous knowledge by a series of scientific tours, investigating the region between the Ems, the Elbe, and the Weser, and the sources of the Danube. Returning to Rome in 52 with Pomponius, he studied for the bar, at which he practised just long enough to satisfy himself that his true vocation was not in the legal order. Accordingly he withdrew to his native Come, and there, during the greater part of Nero’s reign, devoted himself to reading and authorship encyclopedic in their range. Apparently for the guidance of his nephew he wrote in three books his Studii, a treatise defining the culture necessary
PLINY

for the orator before entering on his career, and also for his nephew the grammatical work, *Dubius Sermo*, in eight books. About the close of Nero's life he was appointed procurator (collector of the imperial revenues) in Spain, where in 71 he heard of his brother-in-law's death, by which he became guardian of his sister. In the spring of the following year, when he returned to Rome, two years after, he adopted Vespasian, by this time emperor, whom he had known in the German campaign, was henceforth his most intimate friend, but court favour did not wean him from study, and so we find him bringing land or water his secretary with book and tablet, the history of Rome, by Aurelius Bassus. A model student, amid metropolitan distraction, he began work by candle-light, in autumn before the day was spent, and in winter by 1 or 2 A.M. Ere dawn he would wait on the emperor and discharge the imperial commissions imposed on him, after which he returned home once more to his books. A slight repast intervening, he resumed work, in summer lying in the sunshine while he took notes or extracts from what was read to him. True to his maxim that no book was beneficial that did not benefit him; if it did not benefit him, he seized every opportunity of jotting down all that interested him either as reader or auditor. A cold bath, followed by a slender meal and a brief siesta, preceded the next spell of work, at which he continued till cena, the Roman dinner, at 3 p.m. Even then he listened to the reading of some book, on which he commented. Such was his life when at court; but at his country seat his studies were uninterrupted—an attendant reading to him even in the bath, or writing to his dictation while he was under the auspicium or anointer (ailiptas). On his journeys by land or water his secretary with book and tablets was always at hand. By this lifelong application he amassed materials enough to fill the 100 volumes of manuscript written very small on both sides which, after using them for his *Historia Naturalis* (published 77), he bequeathed to his nephew. His life, uneventful and studious, was quite dramatic in its ending. In 79 he was in command of the Roman fleet stationed off Misenum when the great eruption of Vesuvius was at its height. Eager to witness the phenomenon as closely as possible, he landed at Stabiae (Castellamare) barefoot and naked, and not without some repugnance when his frame, corpulent and asthmatic as his nephew tells us, succumbed to the stifling vapours rolling down the hill.

His *Historia Naturalis* alone of his many writings survives. Under that title the ancients classified everything of natural or non-artificial origin—not only botany, zoology, and mineralogy, but geography, meteorology, and astronomy. Pliny, however, extends even this elastic definition, and adds to his work by digressions on human institutions and inventions, devoting two books to valuable, if not of fine art. He dedicates the whole to Titus, in a turgid, ill-composed epistle, the low literary level of which is maintained throughout. Nor is his inartistic, sometimes obscure, style redeemed by much scientific faculty in handling his theme. He did not pretend to original research, but the philosophical method which sometimes distinguishes the mere compiler is equally foreign to his pages. His observations, made at second-hand, are presented with no discrimination between the true and the manifestly false, the demonstrable and the simply marvellous. He can even be convicted of having misunderstood the authorities on whom he relies. But with every deduction made from it as to matter and form, his compilation is a praiseworthy monument of reading at once extensive and minute, and supplies us with information on an immense variety of subjects as to which, but for him, we should have remained in the dark.

The most convenient text for the student is that of Jan and Mayhoff (6 vols. Leip. 1857-75), which embodies the best results of these recensions by Silling and Detieffsen. The *Chrestomathia Pliniana* (Berlin, 1857) of the great archaeologist Uriahs is particularly valuable on his comments on fine art; while of translations the soundest and most readable is that of Littre, in French, published along with the original Latin (Paris, 1848-50).

Pliny (Gaius Plinius Cæcilius Secundus), the Younger, was born at Novum Comum, 62 A.D. His elevation to the Senate, in thirty-five, was the result of his paternal uncle's death, was conducted under the eye of his mother, Plinia, of his tutor Virginius Rufus, of whose worth, intellectual and moral, he has left a beautiful memorial, and of his uncle who adopted him. He early displayed high literary aptitude, wrote a Greek tragedy in his fourteenth year, and made such progress under Quintillian that, like his friend Tacitus, he became noted as one of the most accomplished men of his time. His proficiency as an orator enabled him, when not more than eighteen, to plead in the Forum, and brought him much praise. He was made a leg of the praetorian guard in will-cases, but also before the senate. Official appointments came to him in quick succession. Then, still young, he served as military tribune in Syria, where he frequented the schools of the Stoic Euphrates, and of Artemidorus; at twenty-five, the earliest possible age, he was quaestor Caesar's then prefect, and afterwards consul in 100 A.D., in which year he wrote his laboured panegyric of the Emperor Trajan. In 103 he became pro- prefect of the Provincia Pontica, but vacated the post in two years, and, among other offices, held that of curator rei publicae, from which he declined only to satisfy his intellectual wants, and on the occasion of floods. He married twice: his second wife, Calpurnia, granddaughter of Calpurnius Fabius, is fondly referred to in one of his most charming letters for the many gifts and accomplishments with which she sweetened his rather invalid life. He died without issue, but in what year is unknown.

It is to his letters that Pliny owes his assured place in literature as one of the masters of the epistolary style. An avowed imitator of Cicero, he has caught much of the charm of his model, while his Latinity is hardly, if at all, inferior in purity and grace. His letters are noted for their generally fuller than his expression, and, reading between the lines, we discern the features of a truly lovable man, quite aware of his strong as of his weak points, much given to hospitality, and always pleased to help a less-favoured brother, such as Suetonius or Martial. We derive from him not a few of our distinctest impressions of the public and private life of the upper class in the 1st century; above all, it is from his correspondence with Trajan that we get our clearest knowledge of how even the most enlightened of the Romans regarded the then obscure sect of the Christians. It appears that a person acknowledging himself a Christian was liable to punishment, even to death. When under examination, however, no Christian would admit anything further than his practice of meeting together for prayer and his co-religionists. He was questioned on the day before it was light; singing a hymn to Christ as God ('or 'as to a God'—quasi deo); and taking an oath which bound him to no crime, but never to commit theft, robbery, adultery, and malfeasance, and never to deny a deposit. Even when put to torture he remained true to his faith. His deaconesses, confessed nothing more to Pliny, who thereupon consulted the emperor as to how he might put the stop of what he could only call 'a depraved and extravagant superstition.' Trajan declined to lay down a general rule for dealing with the Christians; he recommended that they should
not be sought out on suspicion, but that, if accused and convicted of holding that faith, they should be punished. Accusations unsupported by an accuser were not to be received, while suspected cases were to have an opportunity of clearing themselves by offering prayers to the Roman gods (dis nostris).

Keil's text of the Epistles and Panegyricus (Leip. 1853) is the best, while a useful selection with a good commentary has been published by Church and Brodrrib (1858). The whole is difficult and excellently readable; Orrery's, of the Epistles (1751), is still esteemed.

Pliocene System. Strata belonging to this system are restricted in Britain to a limited area in Essex, Suffolks, and Norfolk; but a few isolated patches occur also in Cornwall and Kent. They consist of irregular lenticular beds of sands and shelly gravels, &c., which never occur altogether in one place. The whole series probably does not exceed 120 feet in thickness, and comprises the following groups arranged in descending order:

CUMBERLAND BEDS: fresh-water or marine sands, clays, and sands, with layers of peat; 10 to 70 feet thick. The fossils are land and fresh-water molluscs, many land-plants, and numerous mammalia.

CHILDEBROOK BEDS: sands and clays; 6 to 10 feet thick; contain marine shells, some two-thirds of which are existing species. Norwich CRAG: fluviatile-marine gravel, sand, and loam; 5 to 10 feet thick. Fossils, chiefly marine molluscs; several land and fresh-water molluscs, and numerous mammals. Hence the name of 'mammaliferous crag' sometimes applied to this group. Of the shells 85 per cent. are living species—1 per cent. beach-shore forms.

Rye CRAG: red ferruginous shelly sand, 25 feet thick, but local and insignificant. 90 per cent. of the numerous shells occurring in this deposit are existing species—10 to 7 per cent. being northern forms.

LANSHAM BEDS: sands, &c., 'occupying pipes' or hollows in the chalk of the North Downs, some 600 feet above the sea.

St. Ethel BEds: clays and gravels, near St. Ethel, Cornwall; contain shells, being of marine origin.

WHITE OR CORALLINE CRAG: shelly sands and clays; fossils abundant; 84 per cent. of the shells are living species, and of these 69 per cent. are northern forms. Polyzoa (popularly called corals) are numerous, hence the name sometimes applied to this group.

On the Continent Pliocene marine deposits are met with in various countries, usually in maritime regions. Most of the evidence of the deposit in the Cotentin, Morbihan, and Aquitaine. But it is in the Mediterranean basin that this system attains its greatest development. Thus, at various points along the coast of the Alps in North Italy Pliocene beds have been found comprising Mollusca. On the northern shores of the Mediterranean, and especially in the south, there are many abundant formations which co-existed with the Miocene fauna and which have an extinct fauna. In the Pliocene of Italy, however, continued submerged—the sea extending through the Alar-Casian depression into Asia. One of the most notable events of the Pliocene was the birth of Etne, Vesuvius, and the now extinct volcanoes of Central Italy. In early Pliocene times the climate was mild and genial, but the conditions became less so during the closing stages of the period. This change is evidenced particularly by the increasing number of northern molluscs and the occurrence of ice-rafted erratics in the English Channel.

Pliosaurus. See Plesiosaurus.

Ploc (Ger. Plock), a town of Russian Poland, on the right bank of the Vistula, 60 miles NW. of Warsaw. Its principal building is the cathedral, built in the 11th century. One of the oldest towns in Poland, Plock was the capital of ancient Masovia, and was severely ravaged by the heathen Swedes. Pop. (1838) 20,660, including many Jews.

Plolischti, or Ploesti, a town of Roumania, 37 miles by rail N. of Bucharest, with petroleum-refineries and a large trade in wool. Pop. 33,651.

Pombières, a spa in the French department of Vosges, 14 miles S. of Épinal, sprang into fashion through the favour of Napoleon III., though the virtues of its waters were known ever
since the times of the Romans. There are nearly thirty springs, ranging in temperature from 66° to 150° F.; their waters are helpful against skin diseases, gout, rheumatism, dyspepsia, female complaints, &c. A handsome casino was opened in 1876, and there are picturesque walks and a park in the valley in which the village stands. Pop. 1971.

Plotinus, the most original and important philosopher of the Neoplatonic school, was born at Lyceopolis in Egypt in 205 A.D., and studied philosophy under Ammonius Saccas. In 262 he joined Gordian's expedition to India in order to study the philosophy of India and Persia; but the emperor being murdered in Mesopotamia, he returned hurriedly to Antioch, whence, in 244, he went to Rome. His lectures here were attended not only by crowds of eager youths, but men and women of the highest circles flocked to hear him. Not only Neopythagorean and Neoplatonic wisdom, but asceticism and the charm of a purely contemplative life were the themes on which he, in ever new variations, and with an extraordinary depth and brilliancy, held forth; and such was the impressiveness of his earnestness made upon his hearers that some of them really gave up their fortune to the poor, set their slaves free, and devoted themselves to a life of study and ascetic piety. It is hardly surprising to find that his contemporaries coupled with his rare virtues the gift of working miracles. Sixty years old, he thought of resigning Plato's 'Republic,' by founding an aristocratical and communistic commonwealth; and the Emperor Gallienus was ready to grant a site in Campania for his 'Platonopolis;' but he died near Muntinore in 270. Although he began to think very late in life, he wrote fifty-four books of very different size and contents to the editorial care of his pupil Porphyry, who arranged them in six principal divisions, each subdivided again into nine books or Enneads.

Plotinus' system was based chiefly on Plato's, combined with Neopythagoreanism and the oriental theory of Emanation—i.e. the constant transmission of powers from the Absolute to the Creation, through several agencies, the first of which is 'Pure Intelligence,' whence flows the Soul of the World, whence, again, the souls of 'men' and 'animals,' and finally, 'matter' itself. Men belong to two worlds, that of the senses and that of Pure Intelligence. It depends upon ourselves, however, to which of the two worlds we direct our thoughts most and belong to finally. The ordinary virtues, as justice, moderation, value, and the like, are only the beginning and very first preparation for our elevation into the spiritual realm; purification is a further step, to which we attain partly through mathematics and dialectic; and the abandonment of all earthly interests for those of intellectual meditation is the nearest approach to the goal. The higher our soul rises in this, the deeper it sinks into the ocean of the good and the pure, until at last its union with God is complete, and it is no longer thought but vision and the ecstasy which pervades it. These are a few snatches of Plotinus' philosophical rhapsodies, to which may be added his mysterious belief in a kind of metempsychosis, by which souls not sufficiently purified during life return after death, and inhabit, according to their bent, men, animals, and even plants. He further held somewhat fantastic views as to gods and demons, and professed faith in astrology and magic. His was the last attempt by the ancient world to solve the great problems not by ratiocination, but through introspective mysticism; and his mode of thought had very unmistakable influence on early Christian philosophy, modern theosophy, and various German Idealistic systems.

See NEOPATONISM and works there cited, and works on Plotinus by Kierchner (1854), Ihnen, and Kleist (1884).

Plots must be distinguished on the one hand from Assassinations (q.v.) and on the other from Rebellions (q.v.). They involve the elements of secrecy and conspiracy, but have not always political assassination for their object, nor do those who carry them through, or attempt to do so, put arms in the hands of a great number of men. The subjoined list only professes to give a selection of the more noteworthy plots of history, intended to supplement the lists given under ASSASsINATION and REBELLION. Details of most of them will be found under separate articles.

Gallien's Conspiracy, 23 a.c., Quirinius' Plots, 104, 111, 130. Marino Falier's Plot in Venice, 1355.
Plot of Fieschi against Andrea Doria at Genoa, 1547.
Rain of Ruthven in Scotland, 1652.
Barbington's Plot against Eliza- 
eth, 1546.
Death of Prince Demetrius in 
Russia, 1891.
Governe Conspiracy in Scotland, 1640.
Gunpowder Plot in England, 1605.
Titius Ostes' pretended Popish Plot, 1678.
Muscovite Plot, 1769.
Rye-house Plot against Charles 
I., 1688.
Assassination Plot to kill 
Plot of Catharine against Peter 
III. of Russia, 1762.
Colonel Speedy's Plot against 
George III., 1805.
Plot of Cadizal and Pichgrau 
against Napoleon, 1802.
Malet's Plot against Napoleon, 
1812.
Cato Street Conspiracy, 1829.
Ossian's attempt upon Napoleon 
III., 1856.
Numerous Nihilist plots in 
Russia, 1881-91.
Abdication of Alexander of 
Bulgaria, 1884.

Plough. The first in order and importance of agricultural operations is the breaking up of the soil, and the implement employed most largely for this purpose is the plough. The general form of the plough is known to every one, and to the unobservant eye it appears to be a very simple and even primitive tool; nevertheless, much mechanical skill and ingenuity have been expended in perfectly adapting it to its work. It is a combination of instruments (fig. 1) fastened to a beam,

Fig. 1

GBL; the coulter, K, is an iron knife-blade, for cutting the sod vertically; the share, CFD, which is merely a socket fitted on and not fastened to the body of the plough, has a sharp point, C, and a projecting horizontal edge, CO, on its right-hand side, its part of the work being to separate the under surface of the sod from the subsoil; by means of the mould-board, H, the cutting edge, now wholly separated from the firm ground, is raised up and turned over by the forward motion of the plough;

Fig. 2

and the stile, or handles, one of which, BL, is a continuation of the beam, the other, M, being fastened partly to the former by rods, and partly to the lower portion of the framework (fig. 2), which also shows the point of the plough with the share.
removal), are for the purpose of guiding the implement. The front part of the beam is formed with an upward curve; at its extremity is placed the bridle, N, to which the horses are attached by means of swing-trees and chains or traces, and the object of the curb is to limit the elevation or depression of the horse. The or depress the line of draught, or move it to the right hand or the left, as may be found necessary.

The left sides of the coulter, share, and framework ADEB should evidently be in the same vertical plane. The form of the mould-board is of the utmost importance, and has chiefly attracted the attention of agricultural machinists since the time when improvements on the plough were first projected. Its office being to raise and turn the sod, it is necessary that the surface should slope upwards and outwards from the front, so as to apply a pressure in both directions, and, accordingly, the surface is so shaped that from the point of the share, where it is horizontal, it gradually curves upwards, till, at the extremity, it inclines over away from the body of the plough. The gradual change produced on the position of the furrow-slice is seen in fig. 3, where AEDC on the left-hand side represents the slice untouched by the plough, AD being the line of section by the coulter, DC by the share, BC the open side from which the previous furrow (E) to the right hand side has been separated, and the four successive rectangles, ABCD to the right, illustrate the successive changes of position of the furrow as the mould-board is pushed forward under and on its left side, till it is finally left, as represented in AEDC, on the right hand; E, F, G are furrows which have previously been laid in their proper position. The modern plough is wholly formed of iron, and in nearly all the English and several of the Scotch and Irish made ploughs wheels are attached at or near the front end of the beam, a contrivance which renders the implement more steady in its motion, more easily managed, and capable of doing better work in the hands of an inferior workman. The usual dimensions of the furrow-slice in loam or stony soil are about 8 or 9 inches in breadth by 6 in depth, and in land for green crop 10 or 11 inches in breadth, and 7 to 9 in depth. Shallower ploughing is not infrequently adopted, especially on thin soils, and in various parts of England. Nor is it uncommon to plough staddle-land 10 inches or more in depth.

Other kinds of ploughs are used for special purposes, such as trench-ploughs, which are made on the same principles as the common plough, but larger and stronger, so as to bring up a portion of the subsoil to the surface; subsoil ploughs, some patterns of which have no mould-board, and merely stir and break up the subsoil, thus facilitating drainage; double mould-board ploughs, which are merely common ploughs with a mould-board on each side, and are employed for drilling turnip or potato land, for water-furrowing, and for earthing up potatoes; turn-round ploughs, which have the mould-board so arranged that in going in both directions the furrow is turned to the side; American Chin ploughs, which are exceptionally light in draught, go over the ground rapidly, and break up the surface soil more finely than the ordinary plough; the double-furrow plough, which turns two furrows at one operation, and which, although used on many farms, has not become so popular as was at one time expected. Of all these ploughs there are many varieties, each maker having generally some peculiar views regarding the object and form and proportions of the different parts of the instrument. For those who wish to study minutely the best form of plough it will be necessary to consult works on agriculture and agricultural implements.

The operation of ploughing can only be briefly referred to. Wherever the soil has been sufficiently drained the ridges can be cradled and ploughed on the flat, high ridges being no longer necessary for carrying off the water. It is found in practice that the fewer the open furrows the better, particularly when the land is intended for a grain crop which is to be sown by drill or broadcast with machinery, and when the crop is to be cut with a reaping-machine, as is now almost universally the case. It is curious to notice how one improvement in farm practice leads on to another. The most common mode of ploughing with horses is now simply by casting the soil two ridges in and the next two out, beginning always with the two ridges where last time was left the open furrow.

The process of fearing or commencing a ridge differs according to the state of the land to be turned over. If there exists an old furrow or hollow, as is generally the case in arable land, the two shallow furrows are turned, the one against the other, and so on; along each side of this commencement the plough moves, adding furrow after furrow, and increasing in depth until the third or fourth round is reached. This constitutes what is technically called the gathering system. In newly-cleaned land, or where a hollow does not appear to turn the first furrows into, two furrows are thrown out and then turned lightly in. The most common system, however, is what is known as edging or clearing. That is, after one fearing is accomplished, another is made at the other side of the ridge, and furrow after furrow is turned towards the inside of each of these fearings until the whole ridge is ploughed, and then in the centre is formed the finish or mid—furrow or trench into which the turning is turned the next time the land is ploughed.

The plough is one of the most ancient of implements, and is mentioned in the Old Testament at a very early period, iron shares being also incidentally noticed more than seven centuries B.C. Dr F. R. Taylor has in his admirable clearly shown how the plough arose by gradual development out of the hoe, and that out of the pick or hatchet.

The fields of Sweden were formerly tilled with the 'hack,' of which specimens were still seen in the 19th century. The hack was simply a stake of fir with a broad wooden iron at the lower end cut short and pointed. This implement was gradually made heavier, and dragged by men through the ground, so as to make a simple furrow. Next it was made in two pieces, with
a handle for the ploughman and a pole for the men to drag by, the share was shod with an iron point, and at last a pair of cows or mares were yoked instead of the men. The development of the Egyptian plough was similar. The ancient Egyptian plough was wholly of wood, and in some instances consisted of little more than a pointed stick, which was forced into the ground as it was drawn forward; though there seems to have been ploughs with handles, and with metal socks. The Aryan peoples took pride in their being the ploughing (arara; see Agriculture, Vol. I. p. 88) peoples. The earliest form of the Greek plough, the auto- 

Fig. 5. 
goun (fig. 4, a), is an example of this; it was merely the trunk of a small tree, which had two branches opposite to each other, one branch forming the share and the other the handle, while the trunk formed the pole or beam. The more improved form, the plowton, in use among the Greeks, was not substantially different from the modern form in use in some parts of Asia Minor (fig. 4). The ancient Egyptian plough in one of its early stages is represented in fig. 5. The Romans, an essentially practical nation, largely improved on the plough, adding to it the coulter and mould-board, and occasionally attaching wheels to the beam to prevent the share from going too deep into the earth (fig. 6). The plough was almost unknown among the American aborigines, though Prescott describes a mode of ploughing practised among the Peruvians, which consisted in dragging forward a sharp-pointed stake by six or eight men, its sharp point, which was in front, being kept down in the ground by the pressure of the foot of another man who directed it. The ancient heavy plough dragged by eight oxen was still in use in Aberdeenshire well into the 18th century. In Britain the most important amendments on the plough are not two centuries old, and some of them were doubtless borrowed from the careful agriculture of Holland. England took the lead in improvement, followed some time later by Scot-

Fig. 6. 
goose took out letters-patent for engines and machinery to plough the ground without the aid of oxen or horses, and the attempt has been made to show that steam was the motive power intended to be employed; but, as the first patent was taken out nearly forty years before the Marquis of Worcester described the steam-engine in his Century of Inventions, the grounds for such an opinion do not seem quite satisfactory. In 1769, however, after the steam-engine had been applied to other purposes, there was lodged in the Patent Office the application for a new invention, the object of which was to plough, harrow, and do every other branch of husbandry, without the aid of horses. The patentee was Francis Moore; and so confident was he of the merits of his plan that he sold all his own horses, and persuaded his friends to do the same; because the profits of that noble and useful art will be so affected by the new invention that its value will not be one-fourth of what it is at present. Moore, like many who followed in his wake, was much too sanguine. The truth is that even yet steam-power has only to a very small extent supplantad horse labour in the cultivation of the soil. Early English patentees were Pratt in 1810, and Heathcote in 1832. But the first steam cultivating apparatus which gave anything like satisfac-
tory promise of success was that for which Messrs.
Fiskan of Stamfordham, Newcastle-upon-Tyne,
took out a patent in 1835. Mr Fowler of Leeds,
and Messrs Howard of Bedford, and others
followed with apparatuses of various patterns.
The different inventions brought into notice from
time to time have included plans for engines
travelling over the surface of the ground, drawing
ploughs or other cultivating implements along
with them; engines working on tramways and
drawing implements after them; engines mov-
ing along opposite headlands, and working imple-
ments between them by means of wire-ropes, and
stationary engines driving implements also by
means of wire-ropes. Only two of these systems
got beyond the experimental stage. These are
what are called the direct and round-about—the
former where the pull of the implement is directly
to and from the engine, or between two engines,
one at each end of the furrow; and the latter
where the implement is drawn at right angles.
The best known of the apparatuses now in use are
those made by Fowler, Howard, and Barford
and Perkins, of Peterborough.
The ploughs used in the various systems are very
similar in construction, some taking four and others
six furrows at each time. Fowler’s apparatus is
shown at work in figs. 8 and 9.
It has to be noted, however, that, with all the
ingenuity and capital expended on the perfecting
of the appliances, steam-power has not been employed
in the cultivation of the soil anything like so
advantageously or extensively as was at one time
expected by the advocates of the practice. The
great agricultural depression following the disas-
terous year of 1879 gave the system its first serious
check. The injury unwittingly done to large
extents of land by excessively deep-ploughing—
by burying the good soil and bringing bad material
to the surface—also tended to discredit steam-
cultivation. It has as a rule been found in practice
that moderate ploughing and deep stirring are pre-
ferrable to deep ploughing, and steam-power is now
more largely employed in stirring and harrowing
the soil than in turning it over in furrows. Upon
Fig. 8.—Fowler’s Anchor, Engine, and Plough at work.

extensive farms, where the fields are large and con-
veniently shaped, steam-tillage may be pursued with
excellent results, if the farmer is careful to adapt
the operations to the particular character of the soil.
Steam-tillage, if wisely directed, is more thorough
than tillage by any other power, and the great
speed attainable is also an important consideration,
especially in precarious seasons, when the soil is not
long in a favourable condition for being worked.
See Morton’s Cyclopedia of Agriculture (1856);
Stephens’ Book of the Farm (new ed. by present writer,
1880); and the Book of Farm Implements, by Slicht
and Scott Burn (1859); Professor J. Scott’s Farm Engineer-
ing (1884); and Scott Burn’s Text-book of Farm Engineer-
ing (1885).

Fig. 9.—Fowler’s Plough.

Plough-Monday, or Plow-Monday, the
Monday after Twelfth Day, and termination of the
Christmas holidays, when, according to the old
usage, the plough should be set to work again.
On Plough-Monday ploughmen were wont to drag
a plough from door to door, begging money for
the usual antics and mummeries at the festivity.

Plower, a name given to numerous species of
birds belonging to several genera of the family
Charadriidae. They have a straight compressed
bill, but the upper jaw is slightly inflated and
slightly bent at the point; the nasal groove ex-
tends about two-thirds of the length of the bill, the
necks are longitudi-
nally cleft near the base; the legs, which
are not very long, are
naked a little above
the tibial joint; with
one exception there is
no hind-toe; the wings
are rather long and
pointed, the first quill-
feather is the longest.
The species are numer-
ous, and are found in
every quarter of the

globe; many of them
are birds of passage.
They chiefly frequent
low, moist grounds, where they congregate in
large flocks, and feed on worms, molluscs, in-
sects, &c.; but some of them visit mountain-
ous regions in the breeding season. They fly
with great strength and rapidity, and run with
much swiftness. The flesh and eggs of many
of them are esteemed delicacies. A common
British species is the Golden Plower (Charad-
rius plusialis), a handsome bird, of a blackish
colour, speckled with yellow at the tips and edges
of the feathers; the throat, breast, and belly black
in summer, whitish in winter. The golden plower
is a bird of passage, visiting in summer the
northern parts of Europe, of the west of Asia,
and of North America, and migrating to the
south in winter. It is known in most parts of
Europe, and is common in many districts of
Britain, breeding in the northern counties. Great

Ploughgate, in the law of Scotland, is an
expression denoting a quantity of land of the
extent of 100 acres Scots. See CARCATE.
numbers frequent the sandy pastures and shores of the Hebrides and of the Orkney and Shetland Islands. It makes an artless nest, little more than a slight depression in the ground, and lays four eggs. The parent birds show great anxiety for the protection of their young, and use various stratagems to divert the attention of an enemy. The golden plover exhibits great restlessness on the approach of wet and stormy weather, whence its specific name plumipes. The Ringed Plover (Charadrius hiaticula), locally called Stone-hatch or Sand-lark, a much smaller bird, not uncommon in the more northern parts of Europe, and in Iceland and Greenland. It is grayish brown above, whitish beneath, with a collar of white round the neck, and below it a black—in winter a brown—collar; the head marked with black and white; a white bar on the wing. Very similar, but smaller, and with an incomplete collar, is the Kentish Plover (Pluvialis curvirostris); and also similar in form and habits is the smallest of the British species, the Little Ringed Plover (Pluvialis minutus). Both of these are rare in Britain. The Gray Plover (Squatarola helvetica), a species somewhat larger than the golden plover, is distinguished by the white axillaries, white tail-coverts, and the presence of a hind-toe. North America has a number of species of plovers, such as the Killdeer Plover (Pluvialis vociferus), abundant on the great western prairies, and not unfrequent in the Atlantic states. It utters, when approached by man, a querulous or plaintive cry, like the lapwing, the Green Plover. See DOTTEREL, and LAPWING; and for the so-called Stilt Plover, see STILT.

Plover's eggs are sold in enormous quantities in London and other large towns, and command an extraordinary price, eighteen shillings a dozen or even more, being sometimes given for them, and the cost is seldom less than threepence or sixpence per egg. These are supposed all to be plover's eggs, or, really, lapwing's eggs; but doubtless the eggs of many other birds are substituted, those of the red-shank being very similar in appearance and flavour. Rooke's eggs are too decidedly unlike the plover's to be put in their place. Some sea-birds' eggs are occasionally passed off under the name; and it is said that eggs outwardly unlike plover's have been skillfully painted by linseed in order to deceive. Scotland, Ireland, and Holland are all laid under contribution to produce the tens of thousands of dozens of genuine plover's eggs which it is computed are annually consumed in London.

Plum (Prunus communis or P. domestica), a species of fruit-tree of the natural order Rosaceae.

The plum is so familiar as a fruit in all temperate countries as to need no description here. The Wild Plum, or Blackthorn, or Sloe (q.v.), is common in English hedgerows, thickets, and open woods, and occurs more sparingly in similar places in Scotland. It is grown in Europe generally, and in Russia and central Asia. From the rise all cultivated varieties of the plum are supposed to be derived, but some conjecture that P. spinosa (Bullace, q.v.) and P. spinosa are the parents of some of the types of these varieties. The most reasonable probability is that the original forms of wild plum found in England and in other countries were merely varieties of one species—P. domestica. Other varieties of plum, besides the Sloe, Bullace, and Damson found wild in England, are the Mussel and the Wine Sour, which are used in cooking and in confectionery, and are regarded as primary varieties of the wild plum. The cultivated varieties of the plum are very numerous; there are larger and smaller kinds, but their value in the dessert is reckoned by their sweetness and flavour rather than by their size. Thus, the Green Gage, a kind with only moderately-sized fruit, is the most esteemed of all. It is the Beine Claudia of the French, and the Regina Claudia of the Italians. Magnanis Bomun, a very large white variety, though one of the handsomest, is accounted only of second-rate quality. The uses of the plum for dessert in the making of pies, tarts, preserves, and sweetmeats are familiarly known. Prunes are the dried fruit of certain kinds of plum. The finest of all the French prunes are made at Brignol in Provence of the varieties of plum called Perdriogen blanc and Perdriogen violeta, which are hence named Pruines de Brignol. The manner of converting these plums into prunes is by drying in a slow oven. The fruit is allowed to remain on the tree till it is so ripe that a little shaking would cause it to fall. They are then carefully picked and spread out in the sun on slabs made of lath or wickerwork, till they become soft. Afterwards they are put in a spent oven, and shut up close in it for twenty-four hours, and then taken out. The oven is again heated, somewhat warmer than before, and the plums returned to it till the following day, when they are taken out and turned by slightly shaking the oven. When the oven is reduced rather warmer than before, and the fruit returned to it for twenty-four hours, and so on till the operation of drying is finished, a point which only experience can nicely determine when reached. Other kinds of prunes of inferior quality are made from the fruit of the Petit Damas, and from the Queche, the latter being made in Germany. From this also is distilled a kind of brandy. In Bosnia and Herzegovina nearly 60,000 tons of prunes are produced in a good season. Prunes are nutritious and laxative, and stewed in water are excellent diet in cases of constipation. The manner of converting these plums into prunes is by drying in a slow oven. They impart their laxative quality to the water in which they have been stewed, and thus a pleasant and beneficial decoction may be prepared for those who through impairment of the digestive organs cannot eat the fruit. The plum is grown in orchards as standard and bush trees, or they are in the case of the choicer varieties trained to walls. It is not fastidious as to soil, but the finest fruit is produced on strong but well-drained loam. The superior kinds are propagated by budding or by budding by grafting, the inferior by layers or by cuttings of the roots, the latter being a common method in rearing Damsons in some parts; but the quickest and best method of increasing all is by budding. The wood of the plum-tree is hard and fine-grained, and is used in cabinet-work, in turnery, and for making musical instruments. The Cashmere Plum (P.}
Pluralism

PLURALISM

Bokharensis), cultivated in Cashmire and Bokhara, is regarded as a distinct species. The Cherry Plum, or Myrobalan Plum (P. cerasifera or Myrobalanus), is a bushy shrub, to the sloe, with pendulous globular red fruit. It is a native of North America, but is often cultivated for its fruit on the continent of Europe. In Britain it seldom produces fruit. P. martima is a shrub, indigenous to sandy soils on the seacoast of North America from Massachusetts to Georgia. It has a dark-purple agreeable fruit, about the size of a pigeon's egg. Other native American species are P. chic Micka, the Chick saw Plum, a shrub or small tree of the southern states; P. americana, a bushy tree ranging from Canada to Georgia; and P. glandulosa, of Texas, which is less than a foot high, and has crooked thorny branches.

The Cocoa Plum or lace of the West Indies is the fruit of Chrysobalanus icaco, a tree of the natural order Rosaceae, sub-order Chrysobalanaceae. The fruit resembles a plum, but has a sweet although slightly astringent taste, and is eaten both raw and preserved. The fruit of Parinarium excelsum, another of the Chrysobalanaceae, is called Gray Plum at Sierra Leone. — The term plum is used loosely for the Date Plum (q.v.) and plum or plum-bum was a word once current for £100,000.

Plumage. See Bird, and PLUMER'S PELS.

Plumbago, Plumbaginaceae, a natural order of exogenous plants, herbaceous or half-shrubby, to which belong about 100 known species, chiefly found on the seashore and in the salt marshes of temperate regions. Some are found also in elevated regions in all zones. Many have flowers of great beauty, and are therefore favourites in gardens. Some are occasionally used in medicine as tonics and astringents; others, being exceedingly acrid, as vesicants, particularly species of Plumbago. Thrift, or Sea-pink (q.v.), is the most familiar British example of the order. Statice cotornitana, a native of the United States, and there known by the name 'Marsh Rosemary,' is extremely bitter and astringent, and is used in domestic medicine for niceties of the mouth. Its most abundant principle is tannic acid, of which it contains 12 per cent. Along with this, it gives a resinous and extractive volatile oil, resin, caoutchouc, colouring matter, lignin, and various salts. Sea-lavender (Statice Linumita) — an inhabitant of the coasts of England, generally, but rather rarely so, of the Scottish coasts, contains several species of the western coasts of Europe, the Mediterranean, and western Asia, appearing also on the seashore of South America and of the Carolinas — has the same qualities as the preceding.

Plumago. See BLACK LEAD.

Plumier-work. See BUILDING, SANITATION, SEWAGE, WATER-SUPPLY.

Plumec-bird, a term sometimes given to the Euphineche or Long-tailed Birds of Paradise (q.v.).

Plummer's Pills. See GUAIACUM.

Plumtree. Edward Hayes, was born in London, August 6, 1821, and educated privately and at University College, Oxford, graduating with a double first-class in 1844. The same year he was elected fellow of Brasenose College. He became chaplain at King's College, London, in 1847, and afterwards professor of New Testament Exegesis there. In 1863 he was given a prebend of St. Savin's in 1875 to 1878, he was principal of Queen's College, Harley Street. He was selected preacher at both universities, Boyle Lecturer in 1860-67, and one of the Old Testament Company for the Revision of the Bible. In 1869 he was presented to the rectory of Pluckley in Kent, which four years after he exchanged for the vicarage of Bickley, and in 1881 he was installed Dean of Wells. He received the D.D. degree from Glasgow in 1876. He died after a short illness, February 1, 1891. Of his numerous contributions to theology many may be found in his Boyle Lectures, Christ and Christianity (1867), Biblical Studies (1870), Exposition of the Epistles to the Seven Churches of Asia (1877), Introduction to the New Testament (1883), and The Spirits in Prison (1883), in which he spoke out eloquently his belief in the Wider Hope and an Intermediate State of Probation. He contributed Proverbs to the Speaker's Commentary; Matthew, Mark, Luke, Acts, and 2 Corinthians to Bishop Ellicott's New Testament Commentary for English Readers, as well as Isaiah, Jeremiah, and Lamentations to the same editor's Old Testament Commentary; Ecclesiastes, James, 1 and 2 Peter, and Jude to the Cambridge Bible for Schools; and 1 and 2 Timothy to Dr. Schaff's Popular Commentary on the New Testament. Besides these, his contributions to Smith's Dictionaries and the theological and literary journals were numberless.

Dean Plumtre's name is also widely known by his admirable verse translations of Sophocles (1865), AESCHYLV (1868), and the Commedia of Dante in the metres of the original (1886); as well as by several volumes of original verse, including Launces (1864), Master and Scholar (1866), and Things New and Old (1884). His Life and Letters of Bishop Ken (1886) is less happy.

Plum-pudding. This national English dish is an example of the happy results of the law of survival. The plum-pudding which brightens our ancestors has been drained and dried and squeezed into the moulds of civilization, and few will doubt the 'survival of the fittest' among its ingredients. It is not known when the change from porridge to pudding actually took place. In Hudibras we find a mention of 'minced pies and plum-porridge.' Addison in the Tatler speaks of both as the 'first parts of the dinner;' and in the Spectator, No. 260, plum-porridge is mentioned as eaten on Christmas Day. Southey in his Omnium, vol. i. p. 7, quotes a recipe for plum-pudding given by Chevalier d'Arvieux, who in 1658 made a voyage in an English forty-gun ship. This pudding was directed to be boiled in meat broth, and when mashed up to be covered with grated cheese. In later recipes we find nothing of the kind, unless a hint of plum-porridge be discerned in the mixture called Baue, a posset of raisins of corans with'sweet wyne' and 'crustes of bred.' A recipe for this is given in A Noble Book of Cookery (ed. Napier, p. 109), which must have been written out in the 15th century, but was then probably copied from one of a much earlier date. For a modern recipe the following may be taken: 

Plum-pudding — 1/2 lb. beef suet, 1/2 lb. raisins, 1/4 lb. currants, 1/4 lb. mixed peel, 1/4 lb. bread-crumbs, 1/4 lb. sultanas, 1/2 lb. mixed peel, 1/4 lb. brown sugar, four eggs, one pint of milk, orange slices, and four dozen of brandy, two oz. almonds, half a nutmeg, a little salt. Chop the suet finely, stone the raisins, clean and pick the currants, blanch and chop the almonds, cut the candied peel in thin shreds. Mix all very well together, turn into a well-greased basin, cover with a cloth, and boil for four hours, or, better, steam for twelve hours. Serve with brandy or sweet sauce.

Plumstead. See ERITH.

Plumularia, a genus of Hydrozoa (q.v.) belonging to the division Hydroidea.

Plumule. See SEED.

Pluralism, the holding of more than one office at the same time. Persons in power have often
added to their wealth and consequence by holding several appointments; but such pluralism is forbidden by the constitutional practice of many modern states. In England a minister who holds two political offices (e.g. those of First Lord of the Treasury and Chancellor of the Exchequer) is only half the salary of the second. Pluralism in the church has been held unlawful from the earliest times, and is forbidden by many ancient councils, as Chalcedon (451 A.D.), 24 Nicea (787 A.D.). This prohibition, however, was not regarded as absolute; canonists distinguish between 'compatible' and 'incompatible' benefices or dignities. Two benefices may be incompatible in three ways—(1) if each requires residence; (2) if the duties of both fall to be discharged at one and the same time; or (3) if the revenue of either fully suffices for the living of the incumbent. In other cases benefices or dignities are considered compatible, and with the due dispensation, granted by the pope, may be held by the same person. In England the law of the church has been made more stringent by acts of parliament passed in 1851, 1861, etc., the effect of which is to be that no person can now hold two benefices unless the churches are within two miles of each other and one of them is not worth more than £200 a year. A benefice of 3,000 population is not to be held along with a benefice of 500 population. In other words, if two benefices benefit a clergyman must obtain a dispensation from the Archbishop of Canterbury, and on applying for the dispensation he must forward to his bishop a full statement of particulars in regard to the two cases. Acceptance of a second preferment, except in the cases provided for in the acts, will vacate any preferment previously held. The practice of granting livings to be held in commendam with a bishopric has been abolished. In Scotland it is contrary to the old Scotch statute of 1381 for a minister of the Established Church to hold two or more charges, and the rule has been regularly enforced in the case of two pastoral charges. The question has, however, sometimes arisen with reference to clergymen appointed professors before or after an appointment to a pastoral charge, in which case a resigning president of one college will resign at a certain time after the appointment. Non-established churches, in Great Britain and elsewhere, are guided by the rules of their respective constitutions. See, for England, Cripps, Lives of the Church and Clergy; and for Scotland, Duncan, Parochial Laws.

Plush (Fr. peluche), a variety of cloth woven like silk, from having a longer and more open pile. Formerly this pile was of goat's hair or worsted, but now it is largely made of silk, with a cotton backing, and sometimes the whole fabric is of silk. Silk plush is the material used for the outside of gentlemen's 'silk hats', and for the surface of chenille plush. Chenille also works in coloured silks for articles of ladies' attire and for covering furniture; but plush is used par excellence for lively knee-breeches.

Plutarch (Plountarchos), a prolific writer of the Gracco-Roman period, was born about 46 A.D. at Chaeronea in Boeotia, where his family was one of good standing. Nothing is known of his personal history but what may be gathered from his own writings. His life was commenced at Athens under the academic philosopher Ammonius in 66, the year of the Emperor Nero's progress through Greece. He paid more than one visit to Rome, the then metropolis of the world—on the first occasion in the reign of Augustus as chargé d'affaires of his native town. There he enjoyed the friendship of several men of mark, such as Gaius Sosianus Scenio, who was four times consul, while he devoted himself to a course of study and gave public lectures in philosophy, so that he had but little leisure left for learning the Latin language, and never attained a full knowledge of it. Nevertheless his Latin is remarkably correct, and sound, and free from the idiosyncracies of Roman institutions. The story that he became Trajan's preceptor, and was raised by that emperor to the consulship is a legend of doubtful credit.

Life at Rome, however, was not altogether to his taste; he preferred the quiet of his native place, and the delights of private life muting his taste about 120, discharging the civil and religious duties which fell to his station, liberally disbursing his stores of learning, and offering himself as a sort of spiritual guide and physician of the soul to those who needed moral hygiene and desired to rule their lives by some higher standard in a corrupt and effete age, when the old faiths were dead and the objects of modern life as yet below the horizon.

The extant writings of Plutarch fall into two principal classes—(a) his historical works, (b) those which are grouped under the general head of Parallel Lives—the work by which he is best known. These contain a gallery of portraits of the great characters of the ages preceding his own. They were published in successive books, each pair forming one book (biblion), a Greek and Roman being usually selected to represent the respective careers, being chosen for the subject of each. The forty-six extant Lives were contained in twenty-two books, probably in the following sequence (that in which they are usually arranged being purely arbitrary): (2) Sertorius—Eumenus, (3) Cato—Mnemon, (4) Theocritus—Quintus Ennius, (5) Demosthenes—Cicero, (6) Agis and Cleomenes—Grecechi, (7) Pelopidas—Marcellus, (8) Phocion—Cato, (9) Aristides—Cato major, (10) Pericles—Publius Maccius, (11) Nicias—Crassus, (12) Dion—Brutus, (13) Timon—Anullius Paulus, (14) Thukydides—Titus Flaminius, (15) Thrasicles—Camillus, (16) Alexander—Cesar, (17) Agesilaus—Pompeius, (18) Pyrrhus—Marinus, (19) Solon—Valerius Publicola, (20) Demetrius—Antoninus, (21) Auletes—Coriolanus, (22) Theseus—Romulus, (23) Charon—Hannibal, (24) Theseus—Hannibal, a series, which includes (2) to (9), was written at the suggestion of some personal friends. The biographies in this series partake more of a historical than of an ethical character. The second, (10) to (15), was composed for the writer's own satisfaction and to excite improvement; the third, (20) and (21), and (22) to (24), delivered with prehistoric characters. The single biographies of Aratus, Artaxerxes, Galba, and Otto do not come under the category of Parallel Lives. The sequels which come after most of the Lives, giving a detailed comparison (synkrisis) of each warrior, statesman, legislator, or hero, as the case may be, and of the exact points of resemblance between them, hardly accord with the design of Plutarch, and are therefore regarded as spurious by some critics.

Plutarch's Biographies are not merely popular compilations, but monuments of great literary value for the precious materials which they contain, based as they are upon lost records. The author adheres throughout to his professional maxim of 'neuter eduction' or education was commenced or briefly touches upon the most famous actions or events which distinguish the career of each subject of his biography, holding that these do not show a man's virtues or failings so well as some thrilling incident, word, or jest. C'est là vérité morale,' says Grégoire, 'un vrai historique, qu'il poursuit; l'âne n'est pour lui que
PLUTARCH

le nœvra, l'autre est le but.' For this reason the Parallel Lives are and will remain the book of all ages, for no book of classical antiquity has had more influence upon the leading men of the world, so that Plutarch may almost be called the interpreter of Greece and Rome to modern Europe. They form indeed a complement to the earlier and less moral Plutarch, and the Moralia—a collection of short treatises, sixty or more (though certainly not all from Plutarch's hand), upon various subjects—Ethics, Politics, History, Heathen, Love-stories, and Philosophy. The last comprise discussions of the nature of the world and spiritual beings, On the creation and government of the Universe, On the human soul, and similar speculations, classed by the ancients under the head of Theosophy. 'The treatise upon Isis and Osiris in this series,' says its most recent translator, Mr. C. W. King, 'is the only complete account of the religion of Egypt that has come down to us—written too by one who had been initiated in its deepest mysteries. The three treatises upon the Oracle also are of the highest value, and that on Superstition is one of the most eloquent and clearly written, since it is Professor of the essays, especially those on Brotherly Love, On gradual advance in virtue, On the benefit to be got out of enemies, breathe quite a Christian spirit, although the writer probably never heard of Christianity or of that part of the divine function of the man: 'For the apparent delays in divine justice; another, On the conduct proper to young men at Lectures, which is partly moral, partly social in its tone. The nine books of his Symposium or Table-talk on a variety of topics exist in the hands of the most amiable and genial of boon companions, who appreciated good conversation; while his dialogue Gryllus reveals a remarkable sense of humour.

Though not a profound thinker, Plutarch was a man of rare gifts, and occupies quite a unique place in literature as the encyclopedist of antiquity. He was not master of any science, but whatever was noticeable in natural, moral, or metaphysical science did not come amiss to him, and he had a universal sympathy with genius and nobility of character. As a writer he is burdened with his contemporaries. His name does not even figure in the list of those who have written on the subject of his Dialogues. His Moralia are, in fact, an encyclopaedia of all that was known of the myths and legends of Greece and Rome. His style is free, graceful, and poetical, and he is master of all the forms in which the ancients wrote. His works are those of J. J. Reiske (12 vols. 1742–79) and Dümmler-Döhrer in Didot's Bibliothèque (5 vols. 1846–55). The best text of the Lives is that of Sinentius in the Teubner series (5 vols. 1874–81) of the Moralia, that of Dümmler (12 vols. Oxford, 1790–1803; unfinished), and that in the Teubner series by G. N. Bernardakis (6 vols. published in 1898–99). Separate annotated editions of the Lives have been published by Held, Leopold, Siefert-Blass, Sinentius-Fuhl in Germany, and in England by the present writer, with elaborate commentaries (Sulla, Demosthenes, Greece, Nicias, Timoleon, and Themistocles), and by E. G. Hardy (Galba and Otho). There are translations of the Lives in English by the brothers Langhorne and De Bryden (the latter in the Clough, 5 vols. 1854) neither so scholar-like and correct as the French of Jacques Amoyt (Paris, 1559), from which Sir Thomas North's version (1579; new ed. by W. North and J. Strype, 1727) is a faithful rendering of the Latin text of each separate Life. The best translation of the Moralia is that by several hands, corrected and revised by W. W. Goodwin (Boston, U.S., 1874–78).

Pluto (Gr. Plouton, from ploutos, 'to be rich'), originally only a surname of Hades, as the giver of wealth, is, in the Greek religion, the third son of Cronos and Rhea, and the brother of Zeus and Poseidon. On the tripartite division of the universe he obtained the sovereignty of the under-world—the realm of darkness and ghostly shades, where he is enthroned as a 'subterranean' god, a moralist and ruler of the subterranean, and the spirit of the dead. His dwelling-place, however, is not far from the surface of the earth. Pluto is inexorable in disposition, not to be moved either by prayers or flatteries. He is borne on a car, drawn by four bulls. He is clad in a robe of blue and golden reins. His helmet makes him invisible. According to some scholars, his name of Hades is from a priv. and ideia, 'to see;' although others, with less probability, derive Hades from hadô or hadô, 'I receive or embrace,' and translate the word the 'regarder.' In Homer, Hades never means a place, but always a person. Moreover, it is to be noticed that the poet does not divide the realm of the shades into two separate regions. All the souls of the dead—good and bad alike—mingled together. Subsequently, however, when the ethical conception of retribution became more widely developed, the kingdom of the dead was divided into Elysium (q.v.), the abode of the good, and Tartarus (q.v.), the place of the wicked. This change also exercised an important influence on the conception of Pluto. The ruler of the underworld was not only acquired additional power and majesty, but the very idea of his character was essentially modified. He was now regarded as a beneficent deity, who held the keys of the earth in his hand, and possessed the power of life and death. Hence his epithet in Greek, Pluto or Ploutos, and who blessed the year with fruits, for out of the darkness underground come all the riches and swelling fullness of the soil. Hence, in later times, mortals prayed to him before proceeding to dig for the wealth hidden in the bowels of the earth. Plato married Persephone (Proserpina), the daughter of Demeter (Ceres), after carrying her off from the plains of Enna. He assisted his brothers—according to the mythological story—in their wars against the Titans, and received from the Cyclopes, as a reward for delivering them from Tartarus, the helmet that makes him invisible, which he lent to Hermes (Mercury) in the aforesaid war, to Perses in his combat with the Gorgons, and which ultimately came to Meriones. The Erinyes and Charon obey his behests. He sits in judgment on the open and secret act, and is assisted by three subordinate judges, Ἀκώς, Μίνως, and Ὀδυσσείας. At Ellis alone was there a formal cult of Pluto, though in many places in Greece he was worshipped constantly with Demeter and Kore. In the groves where the flowers the cypress, boxwood, narcissus, and maidenhair were sacred to him; black rams and ewes were sacrificed to him amid the shadows of night, and his priests had their brows garlanded with cypress wreaths. In Hades, the art he employed was weaving Zeus and Poseidon; only his hair hangs down somewhat wildly and fiercely over his brow, and his appearance, though majestic, as becomes so
mighty a god, has something gloomy and terrible about it. — The Plutonian theory in Geology, otherwise called Vulcanist or Huttonian, was opposed to the Nebulist or Wernerian. See GEOLOGY, Vol. V. p. 148, and HUTTON; and for the Plutonic rocks, see also IGNEOUS ROCKS.

Pluviometer. See RAIN-GAUGE.

Plymouth, one of the most famous of English seaports, an ancient parliamentary, municipal, and county borough, lies in the extreme south-western corner of Devonshire, 246 miles by rail (216 by road) WSW. of London, 128 SW. of Bristol, and 53 SW. of Exeter. It occupies the northern shore of Plymouth Sound (see below), immediately at the mouth of the Plym. The remaining space between it and the Hamaoze, the estuary of the Tamar, is occupied by the sister but much smaller town of Stonehouse (q.v.), while still farther to the west, along the Hamaoze itself, stretches the third of the 'Three Towns,' Devonport (q.v.). They are all, however, so united now by continuous lines of houses that, with their respective suburbs, they have lost their individuality, and to the stranger appear one great community. The chief government establishments are at Devonport—the dockyard, gun-wharf, steam factory, and principal barracks; while Stonehouse has its quota in the victualling yard, marine barrack, and naval hospital. Plymouth, which is more populous than the other two together, is at once the chief seat of commerce, trade, and manufacture, and within the 19th century displayed an enterprise which gives it a high place amongst provincial centres. The site is a very fine one. Between the two natural inlet harbours of Sutton Pool and Mill Bay stretches the bold rocky ridge of the Plymouth Hoe, the eastern end of which is occupied by a citadel built by Charles II. Northward the ground rises in a series of long hills, along which the town itself extends until it passes into a suburban hill of singular attractiveness. From the Hoe there are magnificent views both seaward and landward. Here, according to tradition, the captains of the fleet which assembled to meet the Armada whiled away the time by playing a game of bowls, which was interrupted by the news of the approach of the enemy: and here stand a tercentenary memorial to the Armada heroes (1890), and a statue (1884) of Sir Francis Drake (one of Beeld's finest works).

The upper portion of the lighthouse erected by Smeaton on the Eddystone (q.v.) was also rebuilt here in 1882-84. Old Plymouth is chiefly clustered round the shores of Sutton Pool—a dingy unattractive set of narrow streets; but of recent years miles of excellent thoroughfares and many handsome buildings have been erected, chief among them a noble Gothic guildhall, opened in 1874 by the Prince of Wales, Lord High Steward of the Manor ofil. The principal seat of the fine 15th-century church of St Andrew, Perpendicular in style, and restored in 1874-75 by Sir Gilbert Scott; Charles Church (1646-58) is a singularly good example of post-Reformation Gothic; the Roman Catholic cathedral is an effective Early English edifice (1838). The Coffroman collection of sketches by the leading continental artists is at the Proprietary Library; there is a good local museum at the Athenaeum; and among the numerous charitable institutions the first place is taken by the South Devon Hospital, opened in 1834 at a cost of £40,000. The town is served by both the Great Western and London and South-Western Railways. In Mill Bay are the Great Western Docks, now the property of the former company, which are capable of taking the largest merchant vessels. Sutton Pool, the ancient tidal harbour of Plymouth, is reoccupied to a large extent by the commerce of the port, the seat of the fisheries of the port, which are very important. Manufactures, mainly chemical, are carried on—at Cattewater chiefly, but also at Mill Bay. There is a large foreign, and a very extensive coasting trade, and the port is used by lines of passenger-steamers to almost every quarter of the globe.

Though only a fishing-village at the Conquest, under the name of Sutton, Plymouth has for centuries played a leading part in the nautical life. It was the favourite port of the Black Prince; the chief English rendezvous of Drake, Hawkins, Grenville, Raleigh, and their fellows; the final port of departure of the Mayflower with the Pilgrim Fathers. In the civil wars it sided with the parliament, and successfully endured a series of sieges and blockades extending over four years, sharing with Hull the honour of saving the parliamentary cause. It was also the first town to declare for William of Orange. In the great French war it rivalled Portsmouth in naval activities. Among its more distinguished natives are Sir John Hawkins, Sir Richard Hawkins, Sir Thomas Edmonds, W. H. Leach, Sir Thomas Penny, Sir W. Snow Harris, F.R.S., W. Elford Leach, F.R.S., with Northeote, Haydon, S. Prout, Sir C. Eastlake, P.R.A., and S. Hart, the artists. It is now an important scientific centre in connection with the Marine Biological Laboratory (opened in 1888), which publishes a Journal. Plymouth was first incorporated by Henry VI. in 1439, and has since always returned two members to parliament. Pop. (1801) 43,194; (1851) 52,221; (1871) 70,091; (1881) 76,980; (1891) 87,307.

Plymouth Sound, on the south-west of Devonshire, near the entrance of the English Channel, is one of the famous roadsteads of the world. It is a deep inlet, into which the river Tamar falls from the west, and the river Plym from the east. The extreme seaward boundaries of the bay, from which the Sound is so called, are Half Head (mentioned in Ptolemy) and Stoke Point, not far within which a third river, the Yealm, debouches. The Sound, however, is practically bounded southward by a line drawn from Penlee to Wembury Points, and northward by the Plymouth Hoe. Within these limits the depth ranges from 6 fathoms to 3 miles, while its landward depth is about 3. Immediately within Penlee Point, on the western side, is Cawsand Bay, formerly one of the chief anchorages of the port and navy, but so exposed to the south-easterly gales that it was at times very
PLYMOUTH

PLYMOUTH BRETHREN 231

dangerous; while if vessels anchored in the Sound had to clear the full fury of the south-westers. Hence Earl St Vincent, fifteen years afterward, drew a scheme for the provision of artificial protection, and in 1812 the construction of the Plymouth Breakwater was begun, plans prepared by Messrs Rennie and Whidby. This great national work is an artificial mole of stone, a mile in length, stretching across the middle of the Sound, 2 miles from the Hoe, and thoroughly protecting the inner anchorage. It was not completed until 1841, and cost £1,500,000 (see Breakwater). About half a mile from the Hoe is a little island, originally called Eddystone, then known as the Mount, and commonly Drake's Island. This is strongly fortified. A formidable stone fort has also been built on an artificial island immediately within the breakwater; while on either shore there are extensive forts and batteries—Bovisand and Stamford on the east, and at Picklecombe, Maker, and Tregantle on the west. The estuary of the Plym is called the Cattewater, and is a capacious and important inner mercantile anchorage, opening from the Sound eastward, and protected by the estuaries of the Yealm and Yealmpton. The estuary of the Tamar is called the Hameanoe and from the spot at which it enters the Sound between Devil's Point and Mount Edgecumbe to Saltash is nearly 4 miles in length—a still more valuable and thoroughly protected anchorage for vessels of the largest size, and occupied by men-of-war. In the Channel, 14 miles off the Sound, is the dangerous Eddystone Reed (q.v.), indicated since 1760 by lighthouses, and now rather a directing post to the port than a danger. Plymouth Sound is exceedingly beautiful, and has even been considered worthy of rivalship with the Bay of Naples. On its western shore is Mount Edgecumbe, the delightful seat of the Earl of Mount Edgecumbe, traditionally said to have been selected by Medina Sidonia as his share of the English spoil. Rame Head, crowned by the ruins of a medieval chapel, is one of the most picturesque headlands on the coast; and the estuary of the Yealm, with the peaked Meawstone at its mouth, is full of romantic beauty.

See R. N. Worth's History of Plymouth (1871; new ed. 1878); J. W. E. Top. and Biblioth. (1871); L. Jewitt's History of Plymouth (1873); and four works by J. R. Rowe (1873-76).

PLYMOUTH. (1) capital of Plymouth county, Massachusetts, on Plymouth Bay, 37 miles by rail SE. of Boston, is famous as the landing-place of the Pilgrim Fathers (q.v.). Plymouth Rock is a granite boulder at the water's edge on which they landed. It is covered by a handsome granite canopy, and there is also a national monument (1858-89) to the pilgrims; the pedestal, also of granite, stands on a hill overlooking the landing-place, and is 46 feet high, surmounted by a central figure of Faith, 33 feet high, with four allegorical stone figures representing Morality, Education, Freedom, and Law around the base. In Pilgrim Hall (1824-25) are preserved many relics of the first settlement of the country. The town has an iron foundry, mining mills, and manufactures cotton and duck, cordage, nails, tacks, and rivets. It is popular as a summer-resort, and contains a number of hotels. Pop. (1890) 734; (1900) 9592.

—(2) A borough of Pennsylvania, on the Susquehanna River, 20 miles by rail SW. of Scranton, in a coal region. Pop. (1900) 12,000; mostly foreigners.

—(3) The capital of Montserrat (q.v.).

PLYMOUTH BRETHREN, a name given by others to a body of Christians which since 1830 has extended itself throughout the British dominions and in some parts of the continent of Europe, parti-

cularly among the Protestants of France, Switzerland, and Italy, and also in the United States of America. The Brethren originated in a reaction against descrip-

tive High Church principles, as maintained in the Church of England, with everything of a kindred nature in other churches, and against a dead formalism associated with 'un evangelical' doctrine. Members of other religious communities formed in Plymouth and elsewhere were retired Anglo-Indian officers, men of unques-

tionable zeal and piety; but these communities began to appear almost simultaneously in a number of places. Their origin is, however, very much to be ascribed to the work of the young Baptist minister, Nelson Darby (1800-82), from whom the Plymouth Brethren on the continent of Europe are very generally known as Darbyites. Darby was a barrister, who under deeply religious impressions became a clergyman the Church of England, and served as a curate in Wicklow; but in 1827 he left the Church of England from consciences scruples, and became an evangelist un connected with any church. In this character he laboured both in England and on the continent of Europe, preaching in French, English, and German, and his experience was founded at Plymouth the congregation whence comes the name usually given to the communion; the Dublin assembly dates from the same year. He also gave utterance to his opinions in numerous pamphlets, in a quarterly periodical, and a long series of works. The beliefs of the Brethren, as in the case of the Brethren in general, are strictly Calvinistic: original sin and predestination, the efficacy of Christ's sacrifice, the merit of His obedience, the power of His intercession, the gracious operations of the Holy Spirit in regeneration and sanctification are prominent points. Pre-Millenarian views are generally entertained by the Brethren; and they usually practise the baptism of believers without regard to previous infant baptism. Recently among a section household baptism has been prac-

ticed. They partake of the Lord's Supper every Sunday, or 'first day of the week.' They utterly reject the rite of confirmation. Their most distin-

tinctive peculiarity, when contrasted with other Calvinistic churches, is their complete rejection of ecclesiastical organisation. They suppose the whole Christian church to be in the world, derived from truth and duty, like Israel of old, and there-

efore to have been 'corporately rejected of God,' and believe that the church consists of all true believers in the Lord Jesus to whatever denomina-

tion they may belong—holding uniformly that no unbeliever or unregenerate person ought to be recognised as in the church of God. They refuse to recognise any humanly devised form of church government, or any official or salaried ministry; they insist on the privilege and responsibility of every individual to minister according to his gift and ability, in order to the edification of the whole. Practically the number of those fitted publicly to teach or minister the Word of God is very limited, and those who are not fitted for such ministry are not encouraged and sometimes re-

strained.

They distinguish widely between pastors, teachers, and exhorters, whose ministry is to the church, and evangelists, whose ministry of the gospel is toward the world. Whilst disowning human qualifications and ordinations, and generally practising wholly as unscriptural the distinction of 'clergy and laity,' they hold that it is right to own such evangelists, pastors, and teachers as Christ the Head of the Church has bestowed and the Holy Spirit has called them to do. Such men and women wholly to the work of the gospel are supported by voluntary and unsolicited contributions. In their assemblies there are frequent pauses, and liberty
therefore for any member to lead in prayer or praise or to exhort or teach as he may judge to be for edification, guided by spiritually enlightened understanding of what is fitting and in harmony with what is in the Bible. Women in the fellowship take public part in the assembly. Perssons proved to have been guilty of the sins mentioned in 1 Cor. v. 11 are excluded from the fellowship, as well as those who deny foundation truths of Christian doctrine, until evidence of repentance satisfactory to all is given in the church. The Plymouth Brethren reject every distinctive appellation but that of Christians, although a special denomination is found necessary to designate them; no one not holding their views could remain associated with them. A schism took place among them in consequence of the growth of the movement in the 1840s.

Concerning the human nature of Christ: Darby vigorously opposing what he deemed a dangerous error, and he and his adherents utterly separating from the fellowship of those who maintained it, or refused to condemn it, and also from all who, even though holding the teachings of the Plymouth Brethren, refused to endorse the extreme form of separation demanded by Darby. The Darbyite section since Darby’s death has been more than once divided about various questions of doctrine and discipline. The less exclusive principles have attracted many away from the Church of the Plymouth Brethren, by the meetings continue to multiply and increase in Great Britain and Ireland, Canada, the United States, Australia, New Zealand, and elsewhere. The increase is mainly the result of evangelistic work. In the United Kingdom there are about 800 meetings; in Canada, over 100; in the United States, about 100; in Germany, 200; in France, 150; in Switzerland, 80; and in Holland, some 40.

See the works of Darby, Kelly, C. H. Mackintosh, and J. G. Bellett; and books for or against the doctrines of the Brethren by Trotter (1856), Groves (1867), Reid (1873), Miller (1879), Teoton (1883).

Pneumatic Despatch, the name given to a method of sending written documents, chiefly telegraphic despatches, through a comparatively narrow tube by means of compressed air and by a partial vacuum. Early in the 19th century Mr. Millinn proposed to construct a railway on this principle with a tube from London to the North that would be light. (see Murdoch). But Mr. Latimer Clark, C.E., was the first to carry out a plan for the transmission of telegrams by pneumatic power. In 1833 he obtained a tube laid between the central station of the International Telegraph Company and the Stock Exchange, the length of which was sufficient to make the despatches was propelled by a current of air produced by connecting the tube with a vacuum holder. An improvement on this was made in 1838 by Mr. Varley, C.E., who introduced compressed air for the outward and returned the vacuum method for the inward traffic. This method is still in use.

The essentials of a pneumatic despatch are the exhausting and compressing pumps worked by a steam-engine or other motor; a metal tube, which in England is usually a lead pipe, since it is easily made air-tight by soldering the joints; a small carrier of gutta-percha or other material to contain the despatches; and a suitable arrangement of valves at the stations for connecting the tube or tubes with the compressed air or vacuum mains. It has been found by experience that with heavy trains of carriages the pressures in the central tube in the London Post-office, a lead pipe 2¾ inches in diameter is a convenient size, and this is enclosed in an iron pipe for protection. The method of working is this: At the central station end of the tube there is a double sluice valve, and when the carrier is inserted into the pressure chamber (the widened end of the pipe) the lower slide of the valve is drawn so as to close the mouth of the pipe, but on the rod of the slide there is a stop which actuates a lever and rack, and this opens the upper slide in front of the carrier. At the same time, by a separate arrangement, a valve is opened to admit compressed air, which, when the carrier has arrived at the other end of the tube is signalled electrically, the slide is moved so as to cut off the air from the pressure main, and then the chamber at the mouth of the pipe is ready for another carrier. The far end of the pipe is drawn or attached to the central station by making a connection at that station with the vacuum main instead of the pressure main. For a distance of 1000 yards with a 2¾ inch tube the time of transit is one minute when the air pressure is 10 lb. per square inch or with an equivalent effective vacuum of 64 lb. per square inch. With the air pressure and vacuum usually employed, a speed of from 24 to 35 miles per hour is attained in tubes not exceeding a mile in length. The speed varies inversely as the square root of the length of the tube. According to an official statement prepared in 1887, the pneumatic post pipe of the London post-office has been gradually increasing until the system, which in 1854 was represented in London by one 6 horse-power engine working a single tube of a few hundred yards in length, comprised, thirty-three years later, in London alone, four 50 horse-power engines each individual engine being horse-powered at 1,815 r.p.m., and an aggregate length of nearly 34 miles. In 1887 there were in London and the provinces 128 tubes of a total length of 46 miles, requiring fifteen engines with a total of 379 horse-power nominal to work them; 86,000 messages a day were then passed through these post-office tubes. The newspaper offices in several of our large towns have pneumatic despatches in connection with the telegraphic instrument rooms of their respective post-offices. In Paris and some other towns on the Continent, instead of several tubes radiating from a central to outgoing stations as in London, one tube or tubes alongside each other from the central telegraph office form a continuous circular line with intermediate stations, and several carriers linked together are sent at one time. In the United States pneumatic despatches are employed in New York, Philadelphia, and Boston, giving good results in expedition and economy.

Pneumatic Railways and Tramways.—It has been several times proposed to construct pneumatic railways, one plan being to propel carriages by the pressure of a large tube of compressed or rarefied air. A piece of railway of this kind was laid down in the Crystal Palace grounds in 1865 by Mr. Rammel. It consisted of a single line of rails in a tunnel 600 yards in length, along which a carriage conveyed passengers. Motion was given to the carriage by using a fan or hollow disc 22 feet in diameter, which either condensed or rarefied the air as required according to the adjustment of certain valves. This railway did not continue long in operation. The driving of tramcars by compressed air appears more likely to be on a country line, and some tramcars in France tramcars have been propelled by the Mekanisi system of air pressure and local heating since 1876, and a tramway line worked on this principle was in 1889 opened at Paris. In 1890 traction by compressed air was tried at Chester, the tramcar being pulled by compressed air through a 2 miles’ journey, but having means of recharging the reservoir, if necessary, at intervals along the line. See TRAMWAYS.

Pneumatic Power (Transmission of).—The plan of laying down an extensive system of pipes through a city to supply compressed air for motive power of elevators, cranes, and other purposes in small, and
even in comparatively large, industrial establishments is now in successful operation in Paris. A complete plant to supply air pressure was first put down there in 1870 in connection with a pneumatic clock system, and about 9000 of these clocks are now kept going. But the demand for compressed air for other purposes increased rapidly, so that for some years past only a comparatively small proportion of what is supplied by the Paris company is required for clocks. This company has compressing engines, worked by steam, which have an aggregate of 3000 horse-power. These transmit air at a pressure of from 80 to 90 lb. per square inch through 30 miles of mains. The air in the branch pipes has its pressure somewhat reduced by passing it through a filter before being conducted to a motor, which obviates any inequality that might otherwise arise in the pressure if the air were admitted direct to the motor at what it stands in the mains. The amount of compressed air used by any individual or firm is measured by a meter. In 1880 works were established on a large scale in Birmingham to supply compressed air to that town by a system similar to that adopted at Paris. In both of these towns there is a large number of small workshops or industrial establishments where power supplied in this manner is used to drive small machines more economically than by any other method. Other applications of it are to raise water to the upper stories of a building from a well in the basement, for refrigeration, and for winding up telegraphic instruments.

**Pneumatic Gun.** See Air-gun, Cannon.

**Pneumatics** is a name, not very much used now, for the science that discusses the properties of gaseous fluids. It is therefore a branch of Hydrodynamics (q.v.), in the modern acceptation of that term. See also Atmosphere, Barometer, Gas, Sound, Velocity, Wave, Wind.

**Pneumatic Trough** is a piece of chemical apparatus devised by Priestley, by means of which gases can be collected in vessels for experiments or examination. It consists of a vessel of water, provided with a ledge or shelf at the depth of two or three inches from the top. The jars in which the gas to be collected are filled with water, are placed with their mouths downward upon the shelf, which is kept a little under water, so as to prevent the entrance of air into the jars. When the edge of the jar is brought over the extremity of the tube carrying the gas the bubbles of gas rise through the water, collect in the upper part of the jar, and displace the liquid.

**Pneumogastric Nerve.** See Nervous System, Vol. VII. p. 441, and Digestion; also Habershon, Pathology of the Pneumogastric Nerve (2d ed. 1885).

**Pneumonia** or Inflammation of the Lungs is the inflammation of the lungs with the necessary modifications, depending upon a number of distinct pathological conditions. The castrall inflammation of Bronchitis (q.v.) may extend to the alveoli of the lungs, producing scattered patches of catarhal pneumonia. The inflammatory changes in the lungs in consumption, including interstitial pneumonia, or cirsartosis of the lungs; in a few cases of syphilis; in wounds and injuries of the chest; in pyemia; in the last stage of many exhausting diseases, all come under this head. But the most important form, to which the term pneumonia is generally restricted, is that variously called acute, idiopathic, lobar, or croupous pneumonia, and is one of the most striking and definite of familiar diseases.

The changes occurring in an affected portion of lung are described in three stages. (1) **Congestion:**

the lung-tissue still contains air, though less than in health, and is gorged with blood. (2) **Red hepatisation:** the lung-tissue is solid like liver (hence the name), and is much more friable than in health; it still contains much blood, but no air, as the vessels are entirely filled with it. The exudation consists of fibrinous material, mixed with leucocytes and red blood-corpuscles. (3) **Gray hepatisation:** the tissue is still more friable and of a grayish colour, containing now little blood or blood-pigment; the exudation consists of fibrin, as the fibrinous material has disappeared, and it oozes in part from the cut surface as a purulent fluid. It is doubtful whether recovery can take place when this third stage has been reached. When the surface of the lung is affected Pleurisy (q.v.) is always present as well as pneumonia.

The inflammation never attacks the whole of both lungs at once; the right is more often affected than the left, and the lower part than the upper. A whole lobe, or a large part of it, usually suffers; sometimes more than one.

The disease sometimes begins suddenly with a severe rigor or shivering-fit, and the temperature rises rapidly—usually to 103°-105° F. The pulse and respirations are both quickened, but the latter much more in proportion than in most other diseases, a most important indication of the nature of the case, and of the severity of the malady (about 4 pulse-beats to 1 respiration), the proportion becomes 3 or 2 to 1. All the usual signs of fever are present; but the patient's face presents a characteristic dusky flush; there is frequently severe pain in the affected part of the chest, and usually more or less cough, painful, but short, and suppressed as far as possible. In most cases after a few days the spit becomes very viscid and tenacious, and assumes a rusty tinge; this appearance is almost sufficient by itself to show the nature of the disease; but spi fill as well as cough may be absent altogether. The physical signs of the disease are very distinct. There is dullness on percussion over the affected area; and on auscultation marked and very characteristic changes in the breath-sounds.

But if the inflammatory process happen not to reach a portion of the lung in contact with the chest-wall it may be impossible to detect anything abnormal.

It is always a serious disease; but the great majority of cases do recover. The circumstances which make it alarming is the fact that pneumonia is the disease, especially of the heart or kidneys; previous habits of intemperance; and advanced age, as it is much less fatal in youth and middle life than after the age of sixty. Yet sometimes even cases apparently far from hopeful ultimately do well.

In favourable cases the fever usually terminates very rapidly, by crisis, as it is termed; in a few hours the temperature falls five or seven degrees, and the patient's comfort becomes correspondingly relieved. But in a very large number of cases this takes place between the sixth and the eighth day; but it may occur earlier, or it may be delayed to the fourteenth. After this has taken place the exudation in the affected portion of lung is gradually expectorated and absorbed, and as a rule perfect recovery is complete without inflammation.

In a considerable number of cases pneumonia seems to be brought on by exposure to cold or wet. But in the majority no such cause can be traced. Only in very exceptional instances does it seem to be infectious; but evidence on a small scale of not infrequent occurrence, and sometimes assume large proportions. These facts, among others, have led many observers to believe that acute pneumonia ought really to be classed not with local inflammations, but with specific fevers; and that the
inflammation in the lungs has the same relation to the disease as the ulcers in the intestines to typhoid fever, or the inflamed throat to scarlet fever. In 1882 Professor Bedson described a form of micrococcas as occurring in the lungs in pneumonia. But it is doubtful whether it is always present in this disease, and it is sometimes found in other conditions.

It must at present be regarded as an open question whether it is really a simple inflammation, with accompanying febrile disturbance, or a disease analogous to the infectious fevers, with a special local manifestation in the lungs.

The recognised treatment of pneumonia passed through curiously varied phases during the 19th century. Free and repeated bleedings, with extending rapes of a region. Poultries during the earlier decades, were superseded about the middle of the century by equally extensive administration of alcoholic stimulants. But it was gradually discovered that many cases recover perfectly with no other treatment than careful nursing. Its stream began from 1850. It is now an established fact that it has been assigned to drugs only a subordinate place. Rest in bed in the recumbent position; a plentiful supply of fluid nourishment; light poultices, or a thick layer of cotton-wool, over the affected part, are often all that is necessary in a young subject. The danger must be feared in this disease, however, is generally weakness of the heart; and to patients of feeble constitution or advanced age stimulants—digitalis, ammonia, alcohol, &c.—are usually administered, often in large and frequent doses.

Sturges and Coote, History and Relations of Pneumonia (2d ed. 1890).

Po (anc. Eridanus and Padus), the largest river of Italy, rises on Monte Viso, one of the Cottian Alps, at an altitude of 6405 feet, close to the French frontier. It flows eastward for upwards of 20 miles, when, arriving before Saluzzo, it emerges from its rocky defiles and enters upon the plain. From Saluzzo to north of Turin and Chivasso; there it changes its course toward the east, in which direction it flows to its embouchure in the Adriatic. Upwards of 55 miles from its mouth, above Ferrara, it begins to form its delta, 50 miles wide from north to south. The delta is gradually sinking towards the sea, but the Po, flowing from the seashore, now stands 4 miles inland. The Po receives from the left the Ticino, Adda, Mincio, and other streams, and from the right the Trebbia and others. It has an entire length of 360 miles, and drains an area of nearly 28,900 sq. m. Below Parma it forms from the pre-Roman days to the present time, been embanked—in some places with double embankments; and the bed is now high above the plain. It has always been difficult to cross, owing to its width and, still more, the great volume of its waters; hence the strategic and commercial importance of such places as Piacenza and Turin, where the easiest fords are.

Poaceae. See Grasses, Pasture.

Poaching, though not strictly a legal term, has so long been appropriated in popular speech to describe a well-known offence that it is now usually adopted in legal works. It means trespassing on another's lands in pursuit of game; and it is likewise extended to the encouragement of unlawfully fishing in another's waters.

(1) As to Poaching Game.—The general law as to who is entitled to game, and in what circumstances, is stated under the head Game-Laws. In England there are a Day Poaching Act and a Night Poaching Act, imposing penalties on poachers. By the Day Poaching Act, 1831, whoever unlawfully poaches upon any shoot, (q.v.), rabbits, woodcocks, snipe, quails, or land-rails is liable to a penalty of £2. Any person whatever, whether interested in the lands or not, may institute the proceedings for the punishment of the poacher; and the informer is entitled to half the penalty, or his half going to the poor of the parish. When a poacher is found trespassing on a person entitled to the game there, or the tenant, or a gamekeeper or servant of either may demand the poacher's name and place of abode, and if it is refused may arrest such poacher, and take him before a justice of the peace; but the poacher must be taken within twelve hours before the justice, otherwise he is entitled to go at large. In such a case a penalty of £5 may be inflicted. If game he found on the poacher at the time he is caught, and it appears to have been newly caught, the party who is entitled to arrest him is entitled to seize the game also. If the poacher when convicted do not pay the penalty within the time fixed by the justices, he may be committed to the house of correction for a period not exceeding three months. Any person may apply against his conviction to the Court of Quarter Sessions; but he must either remain in custody in the interval, or give security for the costs. The offence of poaching is punished more severely when five or more go out together, and in such case each is liable to a penalty of £5. Moreover, if any of these five or more persons, acting in concert, be armed with a gun, and use violence, each is liable to an additional penalty of £5. By the Night Poaching Act, 1828, which applies to the United Kingdom, it is provided that any person by night, or in the day, poaching in any wood, or other place, is punishable by imprisonment for three months; and for a second offence shall be committed for a period not exceeding six months. The convicted person being in each case liable to a further term of imprisonment on failure to give securities at the end of his sentence; and for a third offence shall be guilty of a misdemeanour, and be liable to penal servitude or two years' imprisonment. In such cases, where the offender shall have been apprehended, and in the act, the owner or occupier of the land or his servants may arrest the poacher, and take him before justices. If the night-poacher, when arrested, use firearms, sticks, or offensive weapons, he shall be guilty of a misdemeanour, and be punishable by penal servitude or two years' imprisonment. In case of three or more night-poachers being armed with guns, bludgeons, or other offensive weapons, each is guilty of a misdemeanour, and is liable to penal servitude or imprisonment for three years. The provisions of the Night Poaching Act, by the amending Act of 1844, extended to public roads and highways, it having been found that the original act was evaded, and the risk of murder greatly increased by poachers frequenting such places.

Under a former law it was, as already mentioned, incompetent for any person except the owner or occupier of the lands or their servants to apprehend the poacher, and even this could be done only when the poacher was caught in the act on the lands; and hence even constables had no power to seize the poacher, though he might be on such lands. But by the Poaching Prevention Act, 1862, which applies to the United Kingdom, if a constable has a suspected poacher in any public place, whom he has reason to suspect of
coming from land where he has been poaching, and of having in his possession game unlawfully got, or a gun or net, such constable may stop and search the poacher; and if game, or implements for taking game, be found on him, may seize and detain them, and summon the poacher before the Justices. If he cannot prove the game was lawfully procured by circumstantial evidence or otherwise that such game was procured by poaching, or that the implements were used for poaching, the poacher may be fined in a penalty of £5, besides forfeiture of the game, and guns, nets, and other implements which he may prove to be his property, and he may also be summoned and search any cart in which he suspects there may be such game or implements. The person convicted may appeal, if he chooses, to the next Quarter Sessions, or, in certain cases, to the Court of Queen's Bench. A conviction can be obtained only in cases of actual seizure of game or implements, but for a conviction it is not necessary that the poacher should be seen actually committing the offence. Poaching hares or rabbits by night in any warren or breeding-ground is a misdemeanour under the Night-poaching Act, 1861. This act does not apply to Scotland.

As game is in the category of wild animals, in England the poacher is entitled to keep the game unless it was both started and caught on the same person's lands. But, as stated above, game may be in reality only stealing under a wilder name, game being as much the fruit of the soil, dependent upon the care and protection of the owner or occupier, as apples or turnips, and that the transition from habitual poaching to stealing is not only easy, but inevitable. The administration of the law by justices, many of whom preserve game, is also objected to. As regards Scotland this objection has been removed by the Game Laws Amendment Act, 1877, under which all summary prosecutions for poaching must be conducted before the sheriff or the petty sessional court of the county or county-town. See Oke, Game Laws (new ed. 1881); Neville, Game Laws (new ed. 1884); Forbes Irvine, Game Laws of Scotland; A. Porter, The Gamekeeper's Manual (2d ed. 1883); Kent, The Fish and Game Laws of the State of New York (1883); and R. Jefferies, The Gamekeeper at Home (1878), and The Amateur Poacher (1880); John Watson, Poachers and Poaching (1881).

(2) Poaching Fish is the unlawfully entering on another's fishery in order to catch fish. Salmon-poaching is illegal or illegal and dangerous because of its dependence on the sea and in all navigable rivers as far as the tide flows; and where he can fish he can catch salmon as well as every other kind of fish. But there is an exception to this generality, which consists in this, that as the crown could before Magna Charta (which took away such right) legally grant a certain fishery in a river to an individual, and as this was, in point of fact, often granted, it follows that it is not uncommon to find, even at the present day, an individual, generally the lord of an adjacent manor, still claiming a several fishery in these places. If he can prove this, he can stop other fishers, and if as far back as one or two centuries it will be inferred that his right dates from before Magna Charta, and it will therefore be sustained. When such is the case the public have no right to fish even in a tidal river or the sea at the specified places, the sole fishing being vested in this individual owner. In streams not tidal the rule is that each riparian owner.—i.e. the owner of the lands on the bank of the stream—has a right to a several or exclusive fishery up to the middle line of the stream. If he is owner of the lands, he has the exclusive fishery in the whole of the stream, so far as his lands extend. As to ponds, whoever is owner of the soil is the owner of a several fishery therein. As to lakes, it is not clearly ascertained how the fishery is to be divided between the owners of the lands therein, but it is supposed that if a highway adjoins a private stream any one may fish in the stream or angle there; but this is a delusion. Nobody is entitled to use a highway for the purpose of fishing or pursuing game, the use of the highway, so far as the public are concerned, being confined to the purposes of travelling or transport. The general rule as to all several.—i.e. exclusive—fisheries is that whoever poaches the fish commits an offence, for which he may be summoned before justices and fined £5, over and above the value of the fish poached; and the person who poaches adjoining the dwelling-house of the owner of the fishery it is a still higher offence, for it is then an indictable misdemeanour. The Fish-poaching Code of England is contained in the Larceny Act, 1861. It is immaterial what kind of fish is caught by poachers, and how they are caught. But a milder punishment is awarded to the poaching angler, for even though he poach in a fishery adjoining the owner's dwelling-house he incurs a penalty of only £2. Whenever a fish-poacher, other than an angler, is caught in the act of poaching he may be at once apprehended, not only by the owner of the fishery, but by anybody; but this can only be done while he is in the spot or near it, for he is entitled to the open highway and unencumbered lands before being arrested he cannot then be apprehended, but can only be summoned before justices in the usual way. In this respect a privilege is given to anglers, for in no case can these be arrested, if they are entitled to the fishery, which is not the case with the poacher, whatever other punishment he may incur, does not lose his fish. With regard, however, to the poaching implements, such as nets, it is
POCAHONTAS

PODARGUS

POCHARD (Fuligula), a genus of diving ducks which are marine during the greater part of the year. One of their distinctive structural features is a membranous lobe on the hind toe. The Common Pochard (F. ferina) is a winter visitor to Britain, and sometimes breeds by the shores of inland meres. The Red-crested Pochard (F. rufiacus) is a rare winter visitor to Britain and the African Pochard (F. nyroca), though the Tufted (F. cristata) and the Spoon (F. marila) are much commoner, and sometimes breed in suitable inland resorts. Nearly allied to F. ferina is an American species (F. americana), and the Canvas-back Duck ('q.v.) also belongs to the same genus.

POCKINGTON, a market-town in the East Riding of Yorkshire, 16 miles ESE. of York. It has a good Early English church (restored 1850) and a grammar-school (1514; reconstituted 1876), where Wilberforce was educated. Pop. 2753.

POCOCK, EDWARD, a learned Orientalist, was born in 1684, and educated at Corpus Christi College, Oxford, of which he was elected fellow in 1728. He early devoted himself to oriental studies, and sailed for Aleppo in 1630 as chaplain to the English factory, but returned in 1636 to fill Land's newly-founded Arabic chair at Oxford, and received in 1643 the college living of Wychbury. His estimable character and great learning raised up for him during the troubles friends like Selden and Owen. He was appointed to the chair of Hebrew in 1648, but his inability to take the engagement of 1649 deprived him of the salary down to the Restoration. He survived till 1701. Pocock's learning was really remarkable, even apart from all allowances for his time. His Specimen Historic Arabum (1649), abridged from Abulfaraj: Porta Mosis (1655)—extracts from Maimonides' Arabic commentary on the Mishna; the Annals of Eutychius (1666), in Arabic and Latin; and an edition of the Arabic history of Barbaraeus (1663), were followed by Commentaries on Mica (1677), Malachi (1677), Hosea (1685), and Joel (1691).

POCOCKE, RICHARD, 'the Traveller,' was born at Southampton in 1704, and educated there and at Corpus Christi College, Oxford. Predecessor successively of Cocks and Water, Bishop of incomes (1745), in 1756 he was consecrated Bishop of Osory, and had just been translated to Meeth, when, on 13th September 1756, while on a visitation, he died very suddenly at Charleville, near Tulhmore. His travels, which took up nearly nine years of his life, and in which he must have ridden some 52,000 miles, are described in two folios dealing with his four years' wanderings in Syria, Egypt, and Mesopotamia (1743-45), in a volume on his tours in Scotland (Scottish History Soc., 1887), in two on his tours through England (Camden Soc., 1888-89) and in one on Ireland (edited by J. T. Stokes, 1891) —books that are as dull as they are valuable. Pococke was, moreover, the pioneer of Alpine travel, for in 1741 he led a dozen Englishmen, all strongly armed, to the Vale of Chamouni, whose grateful inhabitants carried his name and the date on a huge granite boulder close to the Mer de Glace.

POD. See FRUIT.

PODAGRA. See GOUT.

PODARGUS, a genus of birds nearly allied to the true Grouse. They are at home in New Guinea and Australia, are arboreal and nocturnal in their habits, and feed on large insects, which are mostly caught about the trees. Some of them are so expert in capturing trees that Gould says they may be occasionally caught by the hand, or one may be shot without wakening its neighbour. They make rough nests in the eucalyptus or casuarina trees, lay two eggs of spotted white, and the...
work of hatching is shared by both sexes. A podaroma is usually larger than a goose-tuck, and has a wider gape; the oil-gland seems to be absent, and the feathers two remarkable tufts of British brittle feathers, known as "powder-down patches." One of the Australian species, *P. cuvieri,* disturbs the night by a hoarse cry resembling the syllables "More Pork or Mopake," by which names it is therefore known in New South Wales.

**Podestà** (Lat. *potestas,* "power"), an Italian municipal magistrate, sometimes with supreme administrative and military power, sometimes merely judicial.

**Podgoriza,** a fortified town of Montenegro, 16 miles E. of Cetinje, was ceded by Turkey in 1879. Pop. (1885) 6534.

**Podiebrad,** George Bocsko of Podiebrad, Bohemian king, was born of a noble family at Podiebrad on 6th April 1420, and became an adherent of the moderate party of the Hussites (q.v.). When the Catholic barons (1438) carried the election of Albert V. of Austria (11. of Germany), Podiebrad allied himself with the Utraquists in Tabor, where he offered the sovereignty of Bohemia to Casimir, king of Poland. After forcing Albert to raise the siege of Tabor and retire to Prague, Podiebrad was recognised as the leader of the Utraquists; then he seized upon Prague (1448), and got himself made governor or regent of Bohemia, from 1453 to 1457, for the young king Ladislaus. On the death of Ladislaus, Podiebrad was chosen his successor, and was crowned early in 1458. By skilful management and wise policy he succeeded in allaying the bitterness of religious zeal, but only for a while. In 1462 he decided to uphold the terms of the *compacts* of Prague (1453); this angered the pope, Pius II., and he was only prevented from excommunicating Podiebrad through the special intervention of the emperor. The next pope, however, Paul II., did in 1466 promulgate against him the ban of excommunication. Matthias Corvinus of Hungary was the only prince who took the field to enforce it; but he Podiebrad surrounded at Wilamow (1469) and forced into a truce. Nevertheless Matthias was crowned king by the Catholic barons at Olmütz immediately after his death. Podiebrad died on 29th March 1471, having already made arrangements whereby a Polish prince should succeed him.

**Podocarpus.** See Coniferæ.

**Podolia,** or Kamenetz, a government of West, or 'White' Russia, north of Bessarabia, and bordering on the Austrian frontier. Area, 16,224 sq. m.; pop. (1891) 2,617,253, the majority of whom are Hungarians. The surface is a tableland, strewn with hills; nearly three-fourths is arable or available for pasturage.

**Podophialama** (Gr., 'stalk-eyed'), a name often applied to a section of *Crataeæa* (q.v.).

**Podophyllum,** a genus of plants comprising two species, variously ranked by botanists in the natural order Ranunculaceæ, or made the type of a small distinct order, Podophyllææ or Podophyllææ, differing from *Ranunculus* chiefly in having a solitary carpel. The genus Podophyllum has three sepals, six to nine petals, twelve to eighteen stamens, a broad round stigma, seated almost on the top of the germen, and a many-seeded berry. *P. petasum* is a perennial plant, common in North America, and grows in rich woods and on the shady banks of streams, and is known as May-apple, because it flowers and ripens its fruit very early in summer; also as Hog-apple and Wild Lemon. The fruit may be eaten, but is not agreeable. All the other parts are actively emetic. The other species (*P. emodi*) is a native of the Himalayas, and has the same medicinal properties, but in 1859 was shown to yield three times as much of the valuable resin as the American plant.

**Podophyllum** is the resin obtained by means of rectified spirit from the root. In the English Pharmacopœia the root is official, but is only used to prepare the resin (*Podophylli Resina*). The latter is an active purgative, and seems to have the power of relieving the liver by exciting copious biliary discharges. The dose is ½ to 1 grain; its action is slow, generally taking about eight hours. It is apt to grip, and hence is usually given along with carminatives, or in small doses combined with other purgatives.

**Podura.** See Spring-Tails.

**Poe,** Edgar Allan, a talented American littératurist, was born at Boston, January 19, 1809. His mother, Elizabeth Arnold, was an English actress; his father, David Poe, a player of loose habits, the son of a revolutionary veteran at Baltimore. Orphaned at Richmond in his third year, Edgar was adopted by John Allan, a wealthy and childless merchant, who gave him more care than affection. In 1815 the family went to England, and the boy was sent to school at Stoke Newington, a suburb of London. From their return in 1820 till 1825 he attended a classical school at Richmond. The year 1826 was spent at the University of Virginia. Offended by his dissipation and gambling debts, his patron removed him to the counting-room, whence he presently absconded to Boston. Here he published *Tamerlane and other Poems,* by a Bostonian, 1827, a pamphlet of 40 pages (reprinted in London, 1884). Under the new pressure of poverty he enlisted, May 26, 1827, as Edgar A. Perry, giving his age as twenty-two. He served, apparently without fault, in the First Artillery at Forts Independence, Moultrie, and Monroe, and rose to be sergeant-major, January 1, 1829. He now effected a reconciliation with Mr Allan, who procured his discharge, April 15, and after a year's delay his admission to West Point. Meantime his second volume, *Al Aaraaf, Tamerlane, and Minor Poems,* appeared with his name at Baltimore, 1829, 71 pages. He entered the Military Academy, July 1, 1830, recording his age as nineteen. Discipline and constraint did not suit him, and by deliberate neglect of duty he caused his dismissal, March 7, 1831. By this conduct he lost any remaining hope of favour from his patron, and was thrown finally on his own resources, which were probably confined to cadet subscriptions to his *Poems.* The volume appeared as a "second edition" (it was really a third) in
New York, 1831, 124 pages, and contained Irosfel, his earliest poem of value, and To Helen, in a first draft.

Of his life in Baltimore during the next two years few records remain. Here occurred his earliest love-affair, which came to nothing (see 'Poe's Mary') in December 1833. Nearly the fourth of his pen was the $100 prize won by A MS. found in a Bottle, in October 1833. He declined an invitation to dinner 'for reasons of the most humilitating nature—my personal appearance.' John P. Kennedy befriended him, and even, by the testimonial he paid him, showed his approval. From this time he lived with his aunt, Mrs Clemm, and wrote for the Saturday Visitor. Not long before Mr Allan's death in March 1834 Poe made an attempt to see his foster-father, who drove him from the room; this incident, like many others in his life, has been exaggerated. His connection with the Southern Literary Messenger began with its publication of his tale Berenice in March 1835; a few months later he went to Richmond as its assistant-editor. The Clemms soon joined him, and on May 16, 1836, he married his cousin Virginia, who then was nineteen, though a friend swore that she was 'of the full age of twenty-one.' For more than a year he worked hard and usefully on the Messenger, which printed many of his tales, criticisms, and poems, gaining great repute thereby. But Poe was 'irregular, eccentric, and querulous,' and these qualities, with the aid of stimulants, cost him more than one place. He left Richmond in 1837, and after a year or less in New York, of which the chief apparent fruit was The Narrative of Arthur Gordon Pym (1833; 198 pages), in the summer of 1838 established himself (if he could) and at any time to be established in Philadelphia.

Here he prepared The Conchologist's First Book (1839), the matter of which was taken from Cuvier, Wyatt, and Brown; procured at length the publication, without profit to himself, of Tales of the Grotesque and Arabesque (2 vols. 1840); was connected with Burton's Gentleman's Magazine (1839); projected in 1840 the Penn Magazine, which came to nothing, and in 1843 The Stylus, which he never gave up the hope of starting; and for a year (1842-43) edited Graham's Magazine, then in the Pioneer period. His life had been one period of sobriety and patient though ill-requited labour would be interspersed with fits of reckless indulgence and months of desperate poverty. His wife's dangerous illness, caused by the rupture of a blood-vessel while singing, unnerved him, and weakened his always slight power of self-direction. A second prize of $100, won in 1843 by his wonderful story The Gold Bug, again saved the little household from starvation or near it.

In April 1844 he removed to New York, and from October to March following assisted Willis on The Broadway Journal. His poem Home, Home appeared January 29, 1845, and won immediate fame. For a few months he was associated with C. F. Briggs in the Broadway Journal, which became notorious by his assaults on Longfellow as a plagiarist. In this year he published a volume of Tales, and The Raven and other Poems. In the spring of 1846 he occupied the famous cottage at Fordham. Here, January 30, 1847, in deepest poverty, Virginia Poe died, an attractive and pathetic figure, retaining her fragile and childish beauty to the last; she was but twenty-four. Her mother was more than a mere, but a wondrous life of her own, and his book what was best in his nature, and afforded such measure as he attained of happiness.

Except for The Bells, The Domain of Arnheim, the wilful psycho-astronomical 'prose poem' Eureka (1848), and a few minor pieces, the brief remainder of his life might be advanced to beget forgetfulness. Unable to stand alone, he sought vainly, and with an eagerness that approached insanity, to replace what he had lost. He was no libertine; his writings and his life were chaste; with women he was deferential, tender, chivalrous. He idealised them, and in the ensuing years for thirty of his remaining years he could not keep his imaginations in their proper place. Mrs Whitman was not the only object of his homage, and his frantic appeals to her, strangely intermingled with bar-room potations and an attempt at suicide (November 1848), were both controversial and mischievous. From a mind of a mind unhinged. Two months later he was deep in pen-work, and wrote to his 'Annie' that he was 'so, so happy,' with 'how great a burden taken off' his heart. In the spring Mrs Clemm wrote to the same 'Annie,' 'I thought he would die several times. I wish we were both in our graves.'

Starting southward, June 30, he had an attack of delirium tremens in Philadelphia. Recovering, his ticket was furnished by friends who considered it unsafe to trust him with money. He spent over two months in Hells, and at Norfolk, and receiving many attentions. A physician warned him that 'another such indulgence would probably prove fatal.' He became engaged to a lady of means, and about September 30 left Richmond, intending to wind up his affairs in the north and return for his wedding in October. On the 3d of October he was found in a wretched condition at a voting-place in Baltimore and removed to a hospital, where, after expressing the most poignant remorse, he died, October 7, 1849.

Poe's character has been the subject of much heated discussion. Many of his associates, literary and otherwise, have written of his work and of his life. The Memoir prefixed to vol. iii. of his collected works (1850), but since suppressed. Efforts to rehabilitate his memory have been equally far from the truth. After all allowance made for the infirmities of a sensitive spirit, bearing an inherited taint and bowed down by 'unnerving disaster,' the fact remains that he was the main author of his misfortunes. His splendid intellect seemed to lack certain qualities bestowed on common men; his moral vision was less clear, his sympathies were narrow, his will was far weaker than a man's should be. His temperament was feminine, and the 'Imp of the Perverse' was always at his heels. At forty he was no better nor worse than at seventeen, except that his constitution was undermined by excesses. Always he was isolated, absorbed, self-centred, visionary, hopelessly impractical. He wrote to Lowell in 1844, 'My life has been sehr, impulsive, passion, a longing for solitude, a scorn of all things present.' The kindly Briggs, after months of daily intimacy, called him 'characterless' and 'utterly impractical.' He had qualities enough to know that his brilliant writings found with difficulty a slow market and poor prices, but more so that he perpetually sold and resold old things for new. He was more diligent in defending his own ends than in seeking them, in making enemies than in keeping friends. Except Willis, he quarrelled with his employers and associates; men trusted or befriended him to turn from him in the end, and usually with speed. The direct necessity could teach him prudence only by fits and starts; he was not responsible, reliable, respectable as a man; not, upon his own estimate, a man, and his house a failure. His wife had Beauty, caring little for her elder sister Truth; from youth he falsified the facts and dates of his own life, so that his history became a puzzle to be solved by slow and painful labours. Profoundly unmoral, morbid and hectic in his moods, he could bear neither
prosperity nor adversity; 'any motion would up-set him, and his worst falls were after successes, or with success just in sight.'

A member of the seraph and the tramp, he oscillated between the skies and the gutter, gravitating gradually downwards, because he had no god but self. Ambition, aspiration, self-respect, and the strongest love of wealth—these three, and for one devoted child-wife—could not keep him from the brandy and opium which he knew to be his poisons.

As to his genius there is little room for question. Weird, wild, fantastic, almost ghoulish (judged by its results), finding its joy in gloom and its chief inspiration in the dreams and imaginations of dead women, dwelling by choice and habit on themes of ruin and desolation, on the awful, the horrible, even the foul, it was yet most genuine and notable; if not of the highest order, among the most picturesque and striking gifts ever vouchsafed to man. 'everything is subordinately served. In these, and in the more personal of his tales, wherein great wit and madness mingle, he was 'the poet of a single mood.' He will be long remembered for a few poems and many masterpieces of brief, pure prose. His only public walk he stands unsurpassed if not alone, with a halo of mystery, gloom, and terror about him.

Apart from earlier sketches, and Mrs Whittman's *Poë and his Critics* (1809), his life has been written, generally for some reprint of his works. by J. H. Ingram (1874 and 1890), E. H. Stedman (1853; see the six-volume edition of 1884), E. L. Didier (1876), and W. F. Gill (1877). G. E. Woodberry ('American Men of Letters,' 1865) unearthed some new facts. See also E. C. Stedman's *Poe* (1881). An edition by Stedman and Woodberry contains memoir and introduction (10 vols. 1895-96); another edition (10 vols. 1895-96), published by Lippincott, has neither.

**Poerio, CARLO**. Italian patriot, was born on the 10th of December 1803, son of a Neapolitan lawyer who had suffered imprisonment and exile in the cause of liberty. He accompanied his father into exile, but on his return became an advocate at Naples. He was repeatedly imprisoned for his services to the liberal cause; and in 1848 he organised the famous demonstration of the 27th January, which was destined to precipitate the constitution of the 10th February. Under it he was successively nominated director of Police and minister of Public Instruction; but he soon resigned, and was appointed deputy for Naples to the parliament. On the 19th July 1849 he was summarily charged by the provisional Government with the society 'the Italian Unity,' and condemned to irons. With fifteen others he was confined in one small chamber in the island-prison of Nisida. Diplomatic protests from various governments—Mr Gladstone's was an ordered one—had brought from Rome only a tardy and feeble protest in 1850. The allies, however, soon saw that the modern nation had sounded the first trumpet-call of Italian liberty—and eloquent denunciations of the royal tyranny moved Ferdinand II. at last in 1858 to ship sixty-six prisoners to America. They persuaded the captains to land them at the shore, and for one month was confined by Lordown to Turin. There he became a member of the parliament, and in 1861 its vice-president. He died at Florence, 28th April 1867.—The elder brother ALESSANDRO (1802-48); who fell in battle for the liberation of Venice, shared his father's energy, spirit and devotion, and devoted his life mainly to poetry and patriotism. His poems, which contain some of the most stirring Italian songs of freedom, have been repeatedly published. See a monograph on Alessandro by Imbriani (Naples, 1884).

**Poet Laureate. See LAUREATE.**

**Poetry.** That one of the fine arts which employs rhythmical language as the medium of its expression. The present form of the word is of French origin, and was first used as *poetry* (1542), *poeti* (1547), *poetrie* (1566), and *poetry* (1603), as a noun *poetic,* and both are derived from the Greek *poietes,* 'to make.' A poet was *poietes,* 'a maker or composer,' and poetry *poiesis,* 'the act of making or forming.' A poem was *poiesis,* 'a thing made and finished.' Into all these forms there entered the conceptions of artistic fashioning, and poetry from the first was felt to be, like sculpture, painting, or music, the work of a creative craftsman. As we cannot conceive of sculpture without something carved or modelled, or of painting without something painted, so poetry cannot, in the first instance, be conceived without the coincident idea of language rhythmically arranged. If this idea be absent the term must be used allusively or figuratively, as its counterparts often and legitimately are in the cases of those other arts. But to the primitive conception of poetry rhythm is absolutely necessary. In other words, it is only by a license, and in a sense which is unscientific, that we can speak of anything which is not composed in verse as poetry. To this rule, however, there are some conventional exceptions which are not present in his own work.

Verse, therefore, is the essential vehicle of poetry, and on the varieties of versification the external form of any given poetical product depends. That species of rhythm on which verse is founded is the law of regularly recurring succession of articulate sounds. Verse was defined by Dr Edwin Guest as 'a succession of articulate sounds regulated by a rhythm so definite that we can readily foresee the results which follow from its application.' The definiteness, repetition, and formal character of verse-rhythm distinguish it from that laxer and more indulating rhythm which gives charm to fine prose. The difference is one not of amount but of kind. All good verse must be severely regulated, and must obey the laws of its own prosody. The rhythm of prose, on the contrary, must, in order to be good, be recurrent, and be unrecurrent. No greater fault can be committed in prose than the intentional or even accidental introduction of passages which can be read as verse—that is, as recurrent rhythm. Poetry, therefore, in the English sense, is an external form, an arrangement of syllables into verses or staves, distinguished by the rhythmical accidents of quantity and accent, and effected by the law of succession.

This definition of the external form of poetry, however, is not an adequate definition; and to complete it is admittedly so extremely difficult as almost to defy expression. In defining the term poetry,
POETRY

Nevertheless, as an English word, the lexicographers have probably been too much rather than too little affected by the necessity of including a spiritual meaning. Hardly any one has attempted to mean something which excludes unsuccessful effort in rhetorical expression. Hence a certain confusion between the external and the internal, between a craft and an ecstasy. It would be well, perhaps, to bring the term back to its more exact meaning, but it is too late to hope to do this. Poetry must continue to mean not merely language arranged in rhetorical sequence, but verse which is also inspired by imagination, and which attains a measure of perfection in that degree at which it abides. The degree may be a high one, but it is infallible that the rhetorical laws are followed, the work produced must not be refused the title of poetry. The word, indeed, is capable of much expansion. Any man who has written what the world accepts as a *messe*, a finished composition in verse, is allowed the name of poet andlauncher. But our attempts, even though many of them are unsuccessful, are broadly defined as "poetry." The presence of high imagination, and of a brilliant propriety of language, are presupposed in all that is called poetry, but the word must be extended to much that is not very lofty nor very skilful if we are not to slip into pedantry in its use. Wordsworth at one time was of opinion that the only strict antithesis to *Prose* was *Metre*; but it is simpler, as well as more exact, to understand by poetry metrical composition, not troubling ourselves more than is absolutely necessary in its definition about the quality of high imagination. This latter is essential indeed to the best poetry, but not to all poetry in the colloquial use of that term.

In some languages, and particularly in French, *rime* (constantly misspelt *rhyme*, which is a meaningless arrangement of letters formed in imitation of *rhythm*) is an essential part of the form of poetry. In other languages, as in ancient Greek and Latin, *rime* does not exist. In English poetry final *rime*, though not essential, is extremely common, and is the necessary ornament of the main classes of lyrical composition. *Rime* is a correspondence of sound between syllables which occur at regular intervals, and in final *rime* that recurrence always takes place at the end of a verse. It may be single, double, or even triple. *Propriety* and *vigour* in *riming* are important portions of the art of poetry that *rime* cannot be overlooked in the briefest survey. Where *rime* is not rejected altogether, as in blank verse (and in some strophic measures of doubtful value), it forms a main ornament of English verse-composition. One of the chief effects of which poetry produces is due to the skilful arrangement of these recurrent sounds. It is only a poet of great resource and infinite accomplishment who can safely dispense with this fortunate regulation of *rime*. To one who knows his business, the above remarks may be of considerable comfort and encouragement. As Dryden has excellently said, "That which most regulates the fancy and gives the judgment its busiest employment is like to bring forth the richest and clearest thoughts."

It is a popular error that the necessity of finding a *rime* checks the inspiration of a poet, and that he would be more fortunate if he could contrive to do without it. The universal testimony of the poets themselves does not support this notion. The best writers of verse have been unanimous in declaring that the more distinct and spontaneous are the verse-expressions given, the more skilful the brain for verse-expression the more rapidly and inevitably do the *rimes* occur in logical sequence, the proper word fitting into its proper place with as little conscious brain-effort as the proper term or the proper form does in the work of the painter or the sculptor. If this be so, and it seems impossible to doubt it, the difficulty which the unskilful versifier finds in *rimming* is but another safeguard to prevent us from incompetence. For those readers who declare that *rime* gives them no enjoyment, and is only an interruption of the sense, we can but pray that ears may be added to them.

The recognised species of poetical composition are numerous, and are exceedingly difficult to distinguish from one another, because two or more of them may frequently be found existing side by side in the same specimen. Three principal divisions are, however, supposed to include all the minor classes of poetry under general headings. These are lyrical, epical, and dramatic poetry. In the original sense all poetry was *Lyric*—that is to say, was composed to be sung to a musical accompaniment, and could not be conceived except in relation to some supposed accompaniment. In this work of song was divided into two parts, that which was regulated by the air, and that which was expressed in recitative. In the former manner were sung all the poems which were inspired by the passions, which reflected moods individual to the poet, or which were independent of the spirit in particular. In the second manner were chanted matters of narration, statements of fact, didactic, hortatory, and philosophical disquisition. The poems on an air remained lyrical poetry proper, and continued to be more or less fitted to be sung to a musical accompaniment. The poems in recitative became what is vaguely known as Epic poetry, with its attendant classes, the Satire, the Epistle, the Tale, and the Fable. From all these the musical accompaniment soon fell away. In some eastern countries, however, narrative poetry is still, when publicly recited, accompanied by a monotonous music on a stringed instrument.

Dramatic poetry has retained, in its principal branches of Tragedy and Comedy, still less of the singing quality than epic poetry. In many cases drama has thrown off the mask of the air; and in other respects is now included in the general category of poetry partly because of its traditional form, and partly because its imaginative character still links it to lyrical and epic work. The origin of *drama*, however, was wholly lyrical. It was out of the dithyrambical song in honour of Dionysus that tragedy sprang. The litany was chanted by a chorus that danced as it sang, and in the process of time a single personage began to break away from the chorus at intervals, and either to express aspirations of his own, or to narrate stories of the god, or to insinuate the occasion. The *Comedy* had a similar beginning, and by degrees not one but two and then many actors confronted the chorus and drew it into conversation. The development of this new form of poetry was very rapid; it gained variety and a recognised code of forms which has been adhered to with frequent exceptions in the tragedies of *Eschylus*, a body of ancient dramatic poetry still capable, as recent experiments have shown, of satisfying the demands of a modern playwright. Here the purely lyric element, in spite of the predominance of the chorus, is already minimised in favour of the development of personal action and character, so that the subsequent transition to the form of the most modern prose tragedy.
is really very unessential. All the principles of dramatic poetry may be comprised in an essay on the *Agamemnon*.

One of these elements, then, the Song, the Statement, and the Drama, all poetry that is not of a primitive nature is capable of being resolved. That which was primitive—and of this we have to conjecture more than we can prove—was probably Song alone. But, while we divide poetry into these three elements, it is not to be supposed that they form the same easy division of poetical literature. Here are found, indeed, the three great classes, but, as has been already said, they are constantly detected existing side by side in one and the same composition. The more elaborate the species of poetry the more likely are we to find upon analysis that the classes are confounded in it. In the Song we still preserve the simplest form of poem. This is a short piece in regular recurrent rhythm, expressing with the utmost conciseness a single enthusiastic and intense personal emotion, which it pours forth without deviation at a breath. When the spontaneous outburst is over the song naturally closes.

No other species of poetry is so simple as this. The Ode, which is often regarded not merely as a lofty form of lyric, but as the typical form par excellence, is not so long and elaborate to be sung spontaneously, it requires sung in the drama in calling to its aid a chorus and an antithesis of singers; upon epic by its excursions into narrative and didactic reflection. The ode, in which we include its innermost form the Elegy, remains, however, truly lyrical in its intention and singularly ill-fitted to be sung. It offers no musical variety, whereas its very beauties, and in particular those subtle harmonies which are secured by a proper attention to the structure of its quatrains and stanzas, would not merely gain nothing, but would lose much of their lyrical charm. In it we can imagine even the sonnet chanted to some simple conventional melody, unobtrusive enough not to conceal its intellectual beauties nor that vein of reflective and pensive narration which links it to the epic order; and we must confess that we regard the sonnet as essentially lyrical, notwithstanding its complexity and monotony. Not less than the song, the sonnet requires to consist of the spontaneous expression of a single intense emotion. Whatever is true of the sonnet is true of the other traditional forms, some of which, as, for instance, the Rondeau, approach the song more closely, while others, as, for example, the grandiose Chant Royal, take their place on the further side of the sonnet, between the ode and the latter.

If in the divisions of lyrical poetry we find the ode, the sonnet, and the couplet, the counterpart is still more true when we turn to a similar examination of epic and dramatic poetry. In the first case we possess an exquisite form, less successfully cultivated in England than in Italy, the Tera Rex, in which the epic and the lyriepic elements co-exist to an almost equal degree. Here it is impossible to say whether the art of narrative or the art of song predominates. Even in the pure epic neither the lyrical nor the dramatic element is omitted. Whenever a burst of enthusiasm or passion seizes the narrator, he passes without transition into lyric; whenever from describing his personages he proceeds to a record of their conversation, he suddenly transforms his epic into drama. Indeed, the rank of the various sections of the epic order of poetry may almost be determined by the opportunity they give for an admixture of the others. The Epistle is one of the least lyrical sections of all poetry; it may, however, yet contain an element of the drama. Satire, when it compures no admixture of narrative, is apt to fall very low in the poetic scale. If its passion be enthusiastic and genuine it may attain to a certain lyric afflatus; but there is little of the instinct of song in mere rage and disdain. Pure satire is a commonly solely by its very nature and is one of those species of literature which prove the necessity of giving to poetry a definition depending in the first instance not on its truth or beauty as a 'criticism of life,' but on its rhythmic structure.

Drama, as existing in modern Europe, has lost much of the external appearance of poetry. The distinction which admits a comedy in prose within the order of poetical literature and yet excludes a novel seems an arbitrary one. But it can be accounted for on traditional grounds. The novel has always best, from the days of the later Greeks, written in prose, and properly so, for it is independent of regulated form. Comedy, on the other hand, has but very lately, and still not completely, escaped from the bonds of verse. Rhythmic form is still largely used for tragedy, although the tendency in the construction of the spoken is more towards prose, with a restraint which adds to the reader's pleasure, but in a much less degree to the spectator's. In other divisions of dramatric literature verse and even rime are still essential. In Opera, which is a comedy so closely bound with a conventional species of drama, both are necessary; and Pastoral imperatively demands for its graceful convention the ornament of metre. Dialogue, a dramatic form, may be combined even with an epical species as a medium for giving information or exhortation. Hastyly looked at, however, drama appears in its modern aspects to be divorced more and more completely from the sister branches of poetry. It is therefore important to insist on the fact that the great poetical principle of unity in variety rules here as it does in those compositions which seem to be the more complex. To a certain extent, the element holding the parts of a drama together, balancing them, and supplying them with the necessary fire and harmony, the humblest play cannot maintain its existence. It is this more or less concealed, which it is the business of a 'director' to make familiar, which must always distinguish dramatic literature from the varieties of prose fiction. As long as it obeys these laws it holds its place in the order of poetry, although it may have abandoned its rhythmic shape. If it throws off these fortunate restraints it either perishes altogether or it becomes a mere variety of the prose novel.

In the incessant discussion which takes place as to the nature of poetry, the real aspect of the question is too frequently obscured by a confusion between Poetry, as a craft practised by artists, and the Poetical as a classing of compositions. The latter, which has been analysed with extraordinary minuteness by the Germans, and in particular by Goethe and by Hegel, is not necessarily combined with any of the external forms of poetical literature. This distinction, admirably laid down by Diotima in the *Symposium* of Plato, has been generally forgotten by those who have endeavoured to sentimentalise the art and to confuse our ideas of it by such vague and futile definitions as the well-known formula 'Poetry is impassioned truth.' It seems almost waste of words to point out that while the best poetry must be impassioned and must be true, in accordance with Aristotle's dictum that the superiority of poetry consists 'in its possessing a higher truth and a higher seriousness,' yet that no definition which confines itself to mortal
or sentimental attributes can be adequate to distinguish an art which consists of the making of a certain definite thing in a certain definite form.

In short, and in spite of the extreme unwillingness of the metaphysician to acknowledge it, we must admit the idea of the making of poetry cannot be divorced from the incident of 'making,' whether we call it with Wordsworth 'impassioned expression' or employ the broader and simpler word 'execution.' Until the passion and the truth are fused into actual speech, and until that speech takes a rhetorical form, those elements may be 'poetical' as well as 'true,' but they do not form poetry. None of the wild words of Mr Ruskin deserve an immortality of repudiation more thoroughly than the following phrase, which is always on the lips of those who write laxly and nebulously about the poetic art. 'No weight nor mass nor beauty of execution can outweigh one grain or fragment of thought,' says Mr Ruskin. If this were true, half of the noblest poetry in the world would cease to possess any value. Thought may and often does accompany the expression of the passion. But it is not equivalent to it in execution, in imagoes, inseparable in images. 'Execution,' poetry—Horace' (1474-1688). It has a value that is the unity of the artist.

It is desirable to define what is meant by 'execution,' for on this depends our whole conception of the practice of poetry as an art. It is not confined to the observance of the technical laws of this form of composition, to a correct and beautiful use of rhythm, of stanzaic form, of rhyme, and of that variety in unity in which the charm of verse consists. All this is part of poetical execution, and an extremely important part. In most cases it has been held true that an individual cannot be without it. In execution, as in the other fine arts, is the mechanical performance by which the effect desired is produced in the most perfect and most characteristic manner, so as in the happiest combination to illustrate the nature of the art itself and the individuality of the artist. As the medium in which the poet works is language, execution in his case is the arrangement of the best words in the best order, in the best order being, in all but a few anomalous cases, a rhetorical one. The technical laws of verse, however, deal only with the 'best order.' There remain, as a part of execution, 'the best words.' This section of the definition covers all the intellectual propriety, the moral passion, the verbal felicity, the inmost charms and graces, of which 'the best order' is but the vehicle. It is part of a poet's technical work, part of his business as a maker, to produce this manifold perfection of regulated language, and all these beauties of expression and feeling cannot be rudely divided from that execution of which they are an inherent feature. The bad poet may have the intellect of Locke or Newton, and still learn to write poetical negations of his verses that in poetry no weight nor mass of thought can outweigh one grain of executive skill. It would, nevertheless, be a grave error to insist so emphatically on the importance of the outward form of poetry as to encourage neglect of its inward character. In a definition of poetry it has been deemed needful to dwell here on the fact that it is primarily an art and subjected to definite laws. But, as Joubrant has said, 'the lyre is a winged instrument,' and the closest attention to its consecutive arrangement will not give us the quality of light if inspiration be lacking. The vivid pleasure produced by the best poetry is due in large measure to the merits of its execution—its music, the splendor of its images, the harmony and felicity of its arrangement of language. But there is something beyond and above this 'completing feeling of delight,' there is a spiritual emotion which is the spontaneous result of close attention to great poetry, and which is created in the soul only by verse that is of the highest value. This emotion is founded on the Aristotelian qualities of 'the highest truth' and 'the higher seriousness,' and is inseparable from, though not to be confounded with, the mere physical delight in lovely sounds and marshalled groups of images. In this exquisite passion of poetry there is something supernatural, which evades analysis. It combines the experience of the intellectual with the spiritual: it has been felt and witnessed into what has only been, and can only be, imagined. The literature of all countries and of all ages has proved that this subtle and divine emotion is produced in its most direct form by the art of language rhythmically arranged, and to this art is given the name of Poetry.

The prose fragment called the Poetics of Aristotle is the earliest and most important treatise on the art of poetry which has come down to us from antiquity. What is commonly known as Horace's 'Art of Poetry' gives us the vision of an admirable Latin writer on verse and on the poet. In 1527 Vida published his Latin poem, Ars Poetica, which exercised a great authority, and was by many students preferred to Horace. Of more modern interest is Scépeau's Poétique Libri Septem (1561). The first manual of modern Italian prosody was Girolamo Muzio's Arte Poetica (1551). In the English of Elizabeth we have three important treatises on the art. An Apology for Poetry (1593), by Sir Philip Sidney; A Discourse of English Poetry (1586), by W. Webbe; and The Art of English Poetry (1598), by George Puttenham. In France the first important treatise on the art of poetry was the Art Poétique (1604), by Vauquelin de la Fresnaye. Nicolas Boileau, 'the Lawyer of Parnassus,' wrote an Art Poétique. Among French works of the 18th century the most important was the Poétique de la Poésie Française (1749), by Olivier, and Réflexions sur la Poésie (1752), by Louis Racine. Dryden's Essay on Dramatic Poetry belongs to 1699. Among modern works must be cited that portion of Hegel's Aesthétique, 'Guide's History of English Rhymes (1838; new ed. 1882) remains the best authority on British prosody, while the Petit Traité de Poésie Française is greatly to be recommended.

See also in this work English Literature, the sections on literature in the articles on the several countries, and the articles Ballad, Blank Verse, Didactic Poetry, Drama, Essay, Epic Poetry, Epigram, Gnome, Imit., Lyric, Minor, Miscellaneous Poetry, Pastoral Poetry. See also monographs literature and articles on all the best-known poets, including the following:

GREEK.

Homer (about 900).
Alcæus (600-550 B.C.).
Sappho (680-570 B.C.).
Eschylus (525-461 B.C.).
Pindar (500-466 B.C.).
Sophocles (496-405 B.C.).
Euripides (480-400 B.C.).
Aristophanes (445-385 B.C.).
Menander (452-291 B.C.).

LATIN.

Tibullus (53-18 B.C.).
Horace (65-8 B.C.).
Ovid (43 B.C.-A.D. 17 or 18).
Lucan (9-59 A.D.).
Marcellus (101-41 A.D.).
Juvenal (35-137 A.D.).

ITALIAN.

Dante (1265-1321).
Petrarch (1304-74).
Boccaccio (1313-91).
Ariosto (1474-1533).
Tasso (1543-1595).
Goldoni (1707-93).
Alfieri (1749-1803).
Manzoni (1785-1873).
Leopardi (1798-1837).
Pogge (Aponos cataphractus), a small fish, not uncommon on British coasts, also known as Armed Bullhead, Lyre, Pluck, and Noble. It is related to the Bullhead (q.v.). The body, about 6 inches long, is encased by large scales; the head is very broad, and the mouth is very small. Notwithstanding its uncouth appearance, it is good to eat.

Poggenztorf, Johann Christian, a German physicist, was born at Hamburg, 29th December 1796. He studied pharmacy, chemistry, and physics, and was professor of Physics at Berlin from 1834 till 1862. He was a member of the Berlin Academy of Sciences. His chief discoveries were in connection with electricity and galvanism; he also invented a multiplying galvanometer for measuring the electro-chemical action of currents. From 1824 he edited the Annalen der Physik und Chemie, better known as Poggendorff's Annalen, an important organ for the history of the physical sciences. Besides helping Liebig and Wöhler to prepare the Wasserkocher (1837-51), he wrote Lebenslinien zu einer Geschichte der exakten Wissenschaften (1853), Biographisches-Literarisches Wörterbuch zur Geschichte der exakten Wissenschaften (2 vols. 1857-63), and Geschichte der Physik (1879). He died 24th January 1877.

Poggio Bracciolini, Gian Francesco, a famous humanist, was born in 1260 at Terranova in Florence. He studied Latin under John of Ravena, and Greek under Manuel Chrysoloras, and early gained the notice of the Florentine scholars for his skill in copying MSS. About 1492 he became a secretary to the Roman curia; but, though the offices he held were of small importance, he seems to have taken no interest whatever in the movement of church affairs, but to have been devoted heart and soul to the resuscitation of classical learning. In the course of his duties at the Lateran, he explored the Swiss and Swedish convents for MSS., and later in his wider travels to England and elsewhere he never lost sight of the dearest interest of his life. He was able to recover MSS. of Quintilian, Ammianus Marcellinus, Lucretius, Silius Italicus, Voltaire, and other Roman authors. About 1452 he retired to Florence, and next year succeeded Carlo Aretino as historiographer to the republic. Here he died in 1459. His works include Letters (best ed. by Tonelli, 3 vols. Flo. 1852-61); moral essays On Nobility, On the Ineffectuality of Princes (with an account of Age (he himself in 1455 took to wife a girl of eighteen), and the like; a rhetorical Latin History of Florence, in imitation of Livy; a series of unclean and unscrupulous polemical invectives against contemporaries, especially Filippo Strozzi and Valla; and a poor translation into Latin of Xenophon's Cyropaedia. But his most famous book is the Liber Facetiarum, a collection of humorous and not too decent stories and jests, written in fair Latin, and full of merry raffistry at the expense of the monks and secular clergy. The book has been studied in the study of the diffusion and development of folk-tales, and here Poggio takes a place with Straparola, Morlino, Bocaccio, Sacchetti, and Bandello, between the later contovers of who have borrowed or worked up their stories on the one hand, and such earlier storytellers as the Zoppa, the Disciplina Clericorum, the Aurea Legenda, the Gesta Romanorum, and the Fabliaux on the other. A good edition (Fr. trans. and text) is that of Isidore Lisieux (Paris, 1875).

See the Life by Dr Shepherd; also Voigt's Wiederverkündung des klassischen Alterthums, and Symonds' Renaissance in Italy.

Pounding (same root as Eng. pound), in the law of Scotland, means the seizing and selling of a debtor's goods under process of law, or under the warrant of a heritable security, in order to pay the debt. It is either real or personal. Real pounding is the attaching of goods or movables on the land over which some heritable security exists. It is one mode in which heritable security is made efficacious. "The sheriff shall serve the warrant of him that is pounder to the land, to obtain payment of his feu-duities; and the holder of a heritable bond can do the same in order to recover his debt. Personal pounding is the mode in which a decree of the court is made efficacious by the messenger or bailiff seizing the movables of the debtor. In 1839 he was empowered to a debtor has been charged to pay the debt and the days of charge have elapsed. The debtor's
POINSETTIA

POISON

goods being pointed, they are appraised or valued, and the messenger reports his execution to the sheriff, or other judge ordinary, who grants warrant to sell the goods by public rump after advertisements. The net amount of the sale is paid over to the creditor in payment for them, they are delivered to the creditor at the appraised value. There is also another kind of pointing, called a pointing of stray cattle, which takes place whenever the cattle of a stranger trespass on lands, in which case the owner or occupier of the lands can seize them at his own hand, without judicial warrant, and keep them as a security until the damage done by the cattle is paid to the owner of the land. The pointer must, however, take care to keep the cattle in a proper place, and feed them. In England the word pointing is not used, the corresponding term being Distress (q.v.).

POINSETTIA. a name given to the Mexican shrub 

Euphorbia pulcherrima, introduced into the horticulture of other lands by Joel Roberts Poinsett (1779–1851), U.S. minister to Mexico. It is remarkable for the large and conspicuous vermilion bracts below its yellowish flowers.

POINSETTIA-Plire, the principal town and port, though not the capital, of Guadeloupe (q.v.), on the south-west side of Grande-Terre. It is fortified, and has some sugar-boiling. Pop. 17,000.

Point de Galle. See GALLE.

Pointed Architecture. See GOTHIC.

POINTER. a breed introduced from Spain about the middle of the 18th century. The Spanish pointer was a larger and much slower dog than the modern English pointer, rather wanting in stamina, and inclined to "knock up" with a hard day's work; but, if not hurried, was possessed of wonderful nose and powers of scent. As shooting became more common, and guns approached nearer to perfection, the Spanish pointer was found to be too slow and soft. With the object of removing these defects, crosses with the greyhound to improve the speed, and with the bulldog to get courage, were tried, but with little success, until about the beginning of the 19th century the well-known Colonel Thornton tried a cross with the lighter variety of foxhound. He soon succeeded in breeding a light and active dog, capable of ranging at a fast pace for a considerable time, and though possibly not with the nose of the old Spanish pointer, yet with sufficient for the purpose. Other breeders followed suit, and a distinct strain known as the English Pointer was soon established. By careful selection the hound tendency to hunt a foot-scent was eradicated, or nearly so, while some of the speed and staying powers of the hound were retained. The act of "pointing" when the game is first scented was at first carefully taught, but gradually became instinctive, until now well-bred puppies of a few months old may be seen pointing at any object which excites them. In general appearance the pointer somewhat resembles the foxhound, though he is a lighter and more active dog, with a finer coat. The head of the pointer should be rounder, broader, and longer than that of the foxhound, with an intelligent expression; a small eye or too much lip greatly detracts from the appearance. The shoulders should be sloping and powerful, as the dog has often to stop suddenly on a "point" when at full speed. The body should be built on graceful and strong lines, chest not too wide, but very deep, feet round and compact. Liver and white, and lemon and white, are the popular colours, as they are easily seen in heather or turnips, but whole black or liver has many admirers. Owing to the changed conditions of agriculture, the pointer is not now made an extensiy for pheasant shooting, but is still used for grouse. In hot weather, where water is scarce, the pointer has a great advantage over the setter, but succumbs sooner to cold and wet than the heavy coated setter. As the pointer is seldom kept as a companion, his intelligence is not of a high order, but he is easily kept in command, and is generally good tempered.

POISON is commonly defined to be a substance which, when administered in small quantity, is capable of acting deleteriously on the body; but this definition is obviously too restricted, for it would exclude numerous substances which are only poisons when administered in large doses, as the salts of lead, antimony, &c.; hence the quantity required to kill must not enter into the definition. A good practical definition of a poison is "any substance or matter which, when introduced into the body in any way, can destroy life by its own inherent qualities without acting mechanically."

This definition includes poisonsos solids, liquids, and gases of definite chemical composition—the products of decomposition or of bacterial organisms, and the virus of contagious diseases. The last mentioned produce the symptoms of the various infectious and contagious diseases and are not included in treatises on poisons. The others are classified sometimes according to their source, as mineral, vegetable, and animal; or more conveniently according to their action, as Irritants, Narcotic-irritants, Corrosive-irritants, Corrosive, and so forth.

The Irritants, when taken in ordinary doses, speedily occasion intense vomiting and purging and severe abdominal pain. They act chiefly on the stomach and intestines, which they irritate, inflame, and frequently corrode, and may thus occasion inflammation, perforation.

Amongst those which possess corrosive properties are the strong mineral acids, caustic alkalies, corrosive sublimate, &c.; whilst among the pure irritants which exert no destructive chemical action on the tissues with which they come in contact may be mentioned cantharides. The Narcotic-irritants act specially on the brain and spinal cord. Amongst their most common symptoms are giddiness, headache, obscurity of sight or double vision, stupor, loss of power of the voluntary muscles, convulsions, and, finally, complete coma. These poisons have an acrid, burning taste, nor do they usually give rise to vomiting or diarrhoea, and, excepting a slight fulness of the cerebral vessels, they leave no well-marked post-mortem appearance. They are few in number, and none of them belong to the mineral kingdom. The Narcotic-irritants have, as a rule, certain impulse effects of varying periods after they have been swallowed they give rise to vomiting and purging, like irritants, and sooner or later produce stupor, coma, paralysis, and convulsions, owing to their effect on the brain and spinal marrow. As familiar examples we may
point to monkshood, tobacco, and poisonous mush-
rooms. Sometimes the more violent of the poisons
here classed as irritants are made into a separate
group—Corrohle;s; the neroitics are put under the
head Neartities; and the gaseous poisons are treated
as a separate class.

Under the head of Irritant Poisons may be included
(1) Mineral Acids, as sulphuretted, nitric, and
hydrochloric acids; vegetable acids, and some of
their salts, oxide of carbon (hence potash), tartaric
acid, and tartaric acid (in doses of half an ounce or
more); the alkalies, as pearl-ash (carbonate of potash),
soda, and carbonates of lime; common salt, and
pearlash (sodium pernitrate), as well as carbonate
of potash; (2) Vegetable Substances—viz. colo-cynth
and gamboge in large doses, savin, croton-oil,
elaterum, &c.; and (3) Animal Substances, such as
cantharides, to which must be added the occasional
cases in which sausages, and certain fish and
molluscs, usually quite innocuous, act as irritant poisons.
The Narcotic Poisons include opium, hydrocyanic (or prussic
acid), cyanide of potassium, hemoglobin, alcohol, ether,
chloroform, and chloroform. The Narcotic-irritant Poisons
include nux vomica, meadow saffron (Crocus sativus), white
hemlock, the common rue, spikenard, garlic, belladonna,
water hemlock, hemlock water-dropwort (Eunicea crocata),
fool's parsley, thorn-apple, monkshood oraconite, deadly nightshade,
tobacco, Indian tobacco (Lobelia inflata), the bark and
seeds of the common laburnum, the berries and leaves
of the yew-tree, and certain kinds of fungi.
The cases in which there are antidotes qualified
to neutralise chemically the action of the poison are
few in number. For the mineral acids chalk
or magnesia in water must be used, with the
vomiting fluid; bichloride of mercury should be
given freely. The alkalies and their carbonates
must be neutralised by vinegar and water; or lemon-
juce mixed with water, after which milk should be
given. For oxalic acid the antidote is chalk or
magnesia in water, by which an insoluble oxalate
of lime or magnesium is formed. For arsenic the
hydrated peroxide of iron has been regarded as
an antidote, but its efficacy is doubtful. Vomiting
should be excited by the administration of a scruple
of sulphate of zinc in warm water, and, after the
stomach has been well cleared out, demulcent fluids,
such as flour and water or milk, should be given.
Corrosive sublimate combines with albumen (white
of egg), and forms an insoluble inert mass; nitrate
of silver is neutralised by chloride of sodium (com-
mon salt) dissolved in water; tartarated antimony
is neutralised by the administration of decoction
of bark or gall-nuts; and acetate of lead is rendered inert by the administra-
tion of sulphate of magnesia, which converts it into
an insoluble sulphate of lead. In all cases of sus-
pected poisoning, in which the poison is of
unknown nature, the safest course is at once to produce
vomiting by sulphate of zinc, or in its absence by
a dessert-spoonful of flour of mustard suspended in
tepid water, and to continue the vomiting till all
the contents of the stomach are discharged, after
which milk should be given freely.

Most of the known gases have a poisonous action
when inhaled into the lungs; in these cases death
may be due simply to suffocation or to a specific
toxic action of the gas. In cases of poisoning by
smoke, or fume, or by gases, the remedies are
seldom employed as an instrument of self-destruction.
It is established by numerous experiments that air con-
taining more than one-tenth of its volume of car-
bonic oxide, deserves to be considered as a death
of higher animals; when diluted with two or more
volumes of air it can be breathed, and produces
symptoms of vertigo and somnolency, and so great
a loss of muscular power that the individual, if in
an erect or sitting position, falls as if struck to
the ground. The respiration, which at first is difficult
and stertorous, becomes suspended. The action of
the heart is at first violent, but soon ceases, sensi-
bility is lost, and the person now falls into a coma-
tose or death-like state. Those who have been
asphyxiated usually feel pain in the head, and
the general soreness of the body for some days, and in
a few severe cases paralysis of the muscles of the
face has remained. The patient must, of course,
be at once removed from the poisonous atmosphere,
after which artificial respiration should be had
for and continued; poison may be poured on the head and spine; while if the
surface be cold a warm bath should be employed.
When respiration is re-established venesection
will often relieve the congestion of the vessels of the
brain. The inhalation of oxygen gas is said to have been of service in these cases. Carbonic oxide
is also an active poison, and is present in coal-gas
and in charcoal furnaces. Both carbonic acid
and carbonic oxide act as powerful narcotics. The fatal
power of ordinary coal-gas as an asphyxiant and irri-
tant is probably due to the carbonic oxide present;
the post-mortem appearances of the organs in cases of poisoning by coal-gas and by carbonic oxide.
Sulphurated hydrogen, which occurs abund-
antly in foul drains, sewers, cesspools, &c., is a
gaseous poison whose effects are often noticed.
Nothing certain is known of the smallest propor-
tion of this gas required to destroy human life;
but air containing only \( \frac{1}{1000} \) of its volume of this
gas will destroy a dog; and when the gas exists in
the proportion of \( \frac{1}{100} \) it will kill a horse.
During the construction of the Thames Tunnel
death occurred from the men employed in the work,
shut up from the presence of this gas, which was probably
derived from the action of the water on the iron
pyrites in the clay, and which issued in sudden
bursts from the walls. By respiring this atmosphere
the strongest and most robust men were in the
course of a few months reduced to an extreme state
of exhaustion, and several died. The symptoms
with which they were first affected were giddiness,
sickness, and general debility; they became ema-
ciated, and fell into a state of low fever accompanied
by delirium. In this case the dilution was extreme;
when the gas is breathed in a more concentrated
form the person speedily falls, apparently lifeless.
It appears to act as a narcotic poison when concen-
trated, but like a narcotic-irritant when much
diluted with air. The action of the vapour of
sulphide of carbon is somewhat similar, and frequently
present in cesspools, &c., is probably much the
same as that of sulphurated hydrogen. Many of
the gases which are only found as products of the
laboratory are in the highest degree poisons, as
arseniated hydrogen; many are only poisonous
in the presence of some little amount of
risk of inspiring them it is unnecessary to enter
into details.

In point of Law, the use of poison to kill or
injure a human being or certain animals renders
the poisoner amenable to the criminal courts. With
regard to the sale of poisons, the legislature found
it necessary to put some restrictions on one description—viz. arsenic—in order to prevent persons obtaining it with facility, and in such a manner as to avoid the possibility of their being used for the purposes of poisoning. The act requires every person who sells arsenic to enter in his books the date and quantity and purpose of its use, and later acts apply this rule to other poisons. It is not to be sold to one who is unknown to the vendor unless in presence of a witness who is known, and whose place of abode is recorded in the book. The arsenic must also be mixed with soot or indigo, in the proportion of 4 oz. of soot or indigo to the lb. All the boxes, bottles, &c. must be labelled 'Poison.' Those who offend as to arsenic incur a penalty of £50; but in ordinary prescriptions poisons may be used without incurring the view of detection. As to the restriction on the sale of other poisons, see Chemists and Druggists. The offences committed by those who administer poisons to mankind are as follows: Whoever causes death by poison commits murder, for the means are immaterial if the death was caused by such means with a felonious intent. Where death is not caused, nevertheless whoever administers poison, or causes it to be administered to any person, with intent to commit murder is guilty of felony, and is liable to penal servitude for life, or for any number of years, whoever attempts to administer poison, or other destructive thing, to any person with intent to commit murder is guilty of felony, and is punishable in the same way. These offences are committed whether the poison administered or attempted to be administered, does injury or not; and it is a sufficient con- mitting of the offence if the poison is put in such a place that a party was likely, and was intended to take it. Moreover, even though murder was not intended, but merely an intent to endanger life or inflict grievous bodily harm, still the offence is felony, and is punishable by penal servitude varying from three to ten years. There is also a similar punishment for the attempt to administer any stupe- fying drug. Not only is it a crime to administer or attempt to administer poison to human beings, but if cattle are maliciously killed by poison the offender is punishable by penal servitude from three to fourteen years. So to kill by poison any dog, bird, beast, or other animal, ordinarily kept in a state of confinement, is an offence pun-ishable by justices of the peace with imprisonment for six months, or a fine of £20 over and above the injury done by the poison. Any person on land who kill game he incurs a penalty of £10. Moreover, by the Act 26 and 27 Vict. chap. 113, extending to the United Kingdom, whoever sells or offers to sell poisoned grain, seed, or meal incurs a penalty of £10. Whoever sows, lays, or puts on ground such poisoned grain incurs a like penalty. The use of poisoned flesh is also prohibited. But the sale or use of any solution, material, or ingredient for dressing, protecting, or preparing any grain or seed for agricultural use only, if used bonâ fide, is not interfered with.

Secret Poisoning is a mode of taking away life by poisons so slow in their operation that the gradual sinking of the victims under their influence closely resembled the effects of disease or the ordinary decay of nature. It has been practised in all ages, and several undoubted and numerous supposed instances are reported by ancient and modern writers. The prevailing ignorance of pathology and chemistry enabled crimes to be carried out with impunity with poisons which would be readily detected at the present day; and for similar reasons many deaths were ascribed to poison that were doubtless due to natural causes. It is im- possible to attach much credence to stories such as that Henry VI. was killed by a pair of poisoned gloves, or that victims were simply got rid of by inducing them to smell a poisoned rose. And it is wholly incredible that in pre-scientific days treach- eros and secret and mysterious methods of poisoning beyond the power of detection that are happily denied to scientific investigators in days when we are ac- quainted with ten times as many and ten times as subtle poisons. In secret poisoning various preparations of arsenic seem once to have been most frequently used. In the 17th century this atrocious practice became of specially frequent oc- currence; and from this time it rapidly increased, spread over western Europe like an epidemic, and became gradually a regular branch of edu- cation, and the profession of so-called medical men of science, or those who afterwards pretended to heal disease by science, chemistry, magic, or astrology. These persons regarded the knowledge of the mode of prepar- ing secret poisons as of the highest importance, and many of them realised large sums by the sale of their preparations, and occasionally of the secret of their composition. It was in Italy and France that this art was chiefly practised and brought to the highest perfection; but it seems also to have prevailed in England to a considerable extent, for in 1531 the poisoning of seventeen per- sons, two of whom died, by the Bishop of Rochester's chef de cuisine was one instance of the employment of secret poisons to be high-treason, and sentenced those who were found guilty of it to be boiled to death. This act was repealed in 1547.

The only undoubted instance of this crime which appears prominently in English history is the murder of Sir Thomas Overbury (q.v.) by Viscount Chester (the favourite minion of James I.) and his wife, the divorced Countess of Essex. Prince Henry was falsely supposed to have been poisoned by his father, James I. (1612); and James's own death was similarly ascribed to nefarious practices on the part of Buckingham, nay, even of Charles I. (Milton). Undoubtedly such was the popular impression at the time, for Dr Lamb, a conjurer and quack, who was believed to have furnished Buckingham with the poisons, died at the age of three months, and his body was found in a wooden box, which was thrown into Wood Street, Cheapside, London, and beheaded and stoned to death. But it was in Italy that this mode of poisoning was most prevalent. There, judging from the writings of various authors, it seems to have been looked upon as a not unjustifi- able and approved practice of poisoning by poison; and from the time of the Lombard invasion down to the 17th century Italian history teems with instances which sufficiently show that poison was both the favourite weapon of the oppressor and the protection or revenge of the oppressed. The Borgias (q.v.) are generally singled out and held up to the horror and detestation of mankind; but as far as their poisonings are concerned they merely employed this method of destroying their adver- saries a little more frequently than their neigh- bours. To show the popular feeling on this subject was this custom and practice that is mentioned in the Mémoires of Henry II., fifth Duke of Guise, of a soldier who was requested to rid the Duke of Gennaro Annese, one of his opponents in Naples. Assassination was the mode proposed to the soldier, but he 'shrank with horror from the suggestion, and declared that the Duke and Rome were safe from poison Annese.' It was shortly after the date of this story (1648) that secret poisonning became so frequent; and the Catholic clergy, despite the rules of the confessional, felt themselves bound to acquit Pope Alexander VII. with the extent of the practice. On investigation it was found that young widows were extraordinarily abundant in Rome, and that most of the unhappy marriages
were speedily dissolved by the sickness and death of the husband; and further inquiries resulted in the discovery of a scoundrel, scaldy young, of whom, which met at the house of an old bag, by name Hieronyma Spara, a reputed witch and fortune-teller, who supplied those of them who wished to resent the infidelities of their husbands with a slow poison, clear, tasteless, and insipid, and of strength such as made them take the victim at a week, month, or number of months, as the purchaser preferred. The ladies of Rome had been long acquainted with the 'wonderful elixir' compounded by La Spara; but they kept the secret so well, and made each effectual use of their knowledge after several years, during which a large number of unsuspected victims had perished, and even then through a cunning artefact of the police, that the whole proceedings were brought to light. La Spara and thirteen of her companions were hanged, a large number of the culprits were whipped half-naked through the streets of Rome, and some of the highest rank suffered fines and banishment. About half a century afterwards the discovery was made of a similar organisation at Naples, headed by an old woman named 'Frenchman Mary,' who manufactured and sold it under the name of concocted and sold it extensively in Naples under the name of acqua, and even sent it to all parts of Italy under the name of Mania of St Nicola of Bari, giving it the same name as the renowned medicine of all ages, aqua vitae, but a poison. This poison, now best known as the 'Aqua Tofana' or 'Aqua di Perugia,' is said to have been compounded of arsenical neutral salts; while Garrelli states that it was crystallised arsenic dissolved in a large quantity of water; but both of these products were prepared indubitably, and speedily by gradually weakening the appetite and digestive organs. After having directly or indirectly caused the death of more than 600 persons, Tofanile was at length seized, tried, and executed in 1722. From this time the mania for secret poisoning gradually died away in Italy.

Catharine de Medici has been frequently charged with wholesale poisoning, and in 1588 four of the Scottish commissioners who had been present at Queen Mary's marriage to the Dauphin were sentenced to death as poisoners. But the poisoning in question was about the middle of the 17th century that this horrible practice seems to have become most prevalent in France. Here, too, the agents were married women, and their husbands the victims; and, as in Italy, the extent to which the practice was carried was first made known by the clergy. The government, acting on the information thus obtained, seized and imprisoned in the Bastille two Italians named Exil and Glaser, who were suspected of having been the manufacturers and venders of the poisons. Glaser died in prison, but Exil, becoming acquainted with another prisoner named St Croix, communicated to him his secret, which the latter made considerable use of after his release, compounding in particular the poison known as 'succession powder,' which subsequently became the more usual name of it. It was the same St Croix who played such a prominent part in the tragic history of the Marquis de Brinvilles (q.v.). Penautier, the treasurer of the province of Languedoc, and the Cardinal de Bonsy were both pupils of St Croix, and managed, the one to pave the way for his own advancement, and the other to rid himself of his numerous creditors by the administration of poison; but the great influence of these men and the want of direct evidence barred all proceedings against them. Secret poisoning now became fashionable; the passions of jealousy, revenge, avarice, and even petty spite were all satisfied in the same way, and as a necessary consequence other offences decreased in proportion. The prisons filled with suspected criminals, and the 'Chambre Ardente' was instituted for the special purpose of trying these offenders. In Paris this trade was chiefly in the hands of two women named Lavoisin and Lavigreux, who combined with the ostensible occupa- tion of midwife the celebration of masses to wives the decease of their husbands, to neely heins that of their rich relatives, taking care at the same time to be instrumental in fulfilling their own predictions. Their houses were frequented by numbers of all classes, both from Paris and the provinces; every little celebrity, the celebrated Marshal de Luxembourg (q.v.), the Dukes of Bouillon, and the Comte de Soissons; the two former of these, however, went merely from curiosity. Lavoisin and her confederate were at last discovered, tried, condemned, and burned alive in the Place de Cité; 22d May 1680. The poisoners employed in this manner were hung in various cities of France. So common had this atrocious practice been that Madame de Sévigné, in one of her letters, expresses a fear lest the terms 'poison' and 'poisoner' should become synonymous. For two years after the execution of the two Parisian poisoners the crime continued to be largely committed, being fostered by the impunity with which offenders of high rank were allowed to escape; and it was not till more than a hundred persons had been tried and the state of these trials that the government succeeded in suppressing it. The mania for secret poisoning has not since been revived to the same extent, though isolated instances of its practice have occasionally been discovered, particularly in Hungary, where, within the last half of the 19th century, very extraordinary disclosures have at different times been made of the prevalence of this frightful crime among the peasant women. During the times of slavery the Obeah men among the negroes in the West Indies were credited with being expert poisoners. They used vegetable poisons obtained from plants, and there can be no doubt were often instrumental in getting rid of tyrannical or otherwise objectionable masters. In Britain famous poisoning trials have been those of W. Palmer (1885); of Bites (1870); of Taylor (1879); of Croix (1885); of Pritchard, M.D. (two victims, 1865); of Mary Ann Cotton (sixteen victims, 1872); of G. H. Lamson, M.D. (1882); of Cross, M.D. (1887); and Mrs Maybrick (1889). See the articles on ADULTERATION, ASPHYXIANTS, NARCOTICS, DISSECTION, WOUNDS, LEAD-POISONING, PYRAMEI, PITOMINATE, SNAKES, VENOMOUS BITES, WOUNDS; the classification of diseases at DISEASE; for poisoned arrows, ARCHERY and CURAR; for the more important poisons and their treatment, ACID, ARSENIC, HYDROCHLORIC ACID, STARCHINE, UPHAR, &c.; for toxic and anti-toxic methods, and theories therein involved, GERM, BACTERIA, DIPHTHERIA, HYDROPHOBIA, TETANUS, TUBERCULOSIS, and the measures taken for their prevention; and works on toxicology by Christison (1829), Taylor (1847); 2d ed. 1875), Reese (1874), Wormley (1867, 2d ed. 1875), A. Winter Blyth (1883); 2d ed. 1886); and J. D. Mann (1836).—For the Poison Ivy, see SACHUR.

Poison, Simeon-Denis, was born at Pithiviers, in Loiret, 21st June 1781; and received into the École Polytechnique in 1798, attracted the notice of Lagrange and Laplace, and was appointed for him a brilliant career. In 1802 he became a professor in the Polytechnic; in 1808 a member of the Bureau des Longitudes; in 1809 professor in the Faculty of Sciences; member of the Institute in 1812, &c.; and this list of distinctions was crowned in 1837 by his elevation to the dignity of a peer of France. He died 25th April 1840. Poison's
whole life was devoted to the prosecution of scientific research, and the fruits of his pen number about 300 publications, including 30 books. Poisson was a professor of the Ecole Polytechnique, of the Academy of Sciences, and other scientific journals. Of the separate treatises published by Poisson the best known is the Traité de Mécanique (2 vols. 1833); others were on capillary action, the mathematical calculus of probabilities, and the mathematical theories of heat, and, lastly, the celebrated work Sur l'Invarianibilité des moyens Mouvements des grands Axes Planetaires.

Poitiers, the capital of the French department of Vienne, occupies the summit and slopes of a little eminence, round which once flowed the Clairs and the Beivre, 61 miles SSW. of Tours. Before the revolution it had an immense number of religious edifices, which even yet are sufficiently numerous. The most interesting are the little Temple de St Jean, originally a baptistery of the 6th or 7th century; the abbey church of St Radegonde, with the same name of the pilgrims; and the noble cathedral of St Pierre (1161-15th century), in which, or in the older edifice that occupied its site, twenty-three councils were held—the first in the 4th, and the last in the 15th century. Other edifices are the Palais-de-Justice (the palace formerly of the Counts of Poitou) and the Hôtel-de-Ville (1876). A university, founded by Charles VII. in 1431, is now represented by a school of law, with faculties also of science and literature. There are besides a public library of 30,000 volumes and 400 MSS., a museum, and several learned societies, including one for studying the antiquities of western France (1834). Pop. (1872) 28,247; (1891) 37,497. Poitiers, the Limousin of the Romans, derivatives its present name (earlier Poictiers) from the Pictavi or Pictones. In and around it are numerous Celtic and Roman remains, a dolmen, baths, some fragments of a huge amphitheatre, &c.; and here in 1882 the remains of a whole Gallo-Roman town were discovered, with temple, baths, and streets, spread over 14 acres. In the vicinity Alaric II., the Visigoth, was defeated and slain by Clovis in 507; and southwest of Poitiers the famous Wars Charles Martel won his great victory in 732 over the Saracens under Abd-ar-Rahman. Later still (on 19th September 1356), at a spot 5 miles north of Poitiers, Edward the Black Prince, with some 12,000 or 14,000 Englishmen and Gascons, defeated the army of the troops of King John of France, killing 11,000 and taking more than 2000 prisoners, among those the monarch himself and one of his sons. St Hilary (q.v.) was the first bishop of Poitiers, which long was capital of the province of Poitou. From this town the ancient family took its name to which Diana of Poitiers (q.v.) belonged.

Poitou, a former province of south-western France, coincident with the present departments of Deux Sèvres, Vendée, and Vienne. It was divided into Upper and Lower Poitou, and had for its capital Poitiers. Its early history is the same as that of Aquitania (q.v.). Poitou became a possession of the English crown when Eleanor, Countess of Poitou and Duchess of Aquitaine, married (1152) Henry of Anjou (see Henry II.). Philip Augustus reconquered it in 1205. In 1399 it reverted to England, but nine years later was retaken by Charles V. See Aubr, Histoire de Poitou (1880-88).

Poke (Phytolaca americana), an American bracteate racemose, white flowers and deep-purple berries (Inkberries or Pigeonberries). See also HELLEBORE.

Poker, a round game at cards (developed from the older game of brag). Each player has five cards
dealt him. A sum called the ante is deposited by the oldest hand. The players then look at their hands. The round may then begin. If the player to the left of the dealer chooses not to play, his opponent may do so, if he will play or pass. If he passes he throws down his cards and stakes nothing. If he plays he has to chip to fill—i.e. to stake a sum equal to twice the ante; the amount chipped by the ante, if he plays, or makes good the ante, is only equal to his first stake. Each player's contention may then discontinue any of his cards and receive from the dealer an equal number of cards from the top of the pack, but no one is obliged to discard any. When all have filled, each player in order must either raise his stake or go out of the game, forfeiting what he has chipped. The raising generally is limited, but any less sum than the limit is to be considered. Subsequent players must either see the raise—i.e. make the sum next staked equal to that of the last raiser—or go before—i.e. raise higher, or go out of the game. The raising, seeing, going better, or going out, as the case may be, continues until either all the players but one have got out (when the one left in takes the pool), or until all the stakes of the players left in are equal, no one going better. Then a call is declared. The player to the left of the one who calls takes the pool. He has then a new hand, and the best combination he holds which has a poker value. The subsequent players in order either show anything they have better, or throw down their hands. The best poker hand takes the pool.

In case of absolute equality the pool is divided. The value of the hands is as follows, beginning with the best: (1) Straight flush, sequence of five cards of the same suit; (2) Fours, four cards of the same rank, accompanied by any other card; (3) Full, three cards of the same rank, and a pair; (4) Flush, five cards of the same suit, not in sequence; (5) Straight, any five cards in sequence; (6) Triplets, three cards of the same rank, not accompanied by a pair; (7) Two pairs; (8) One pair; (9) Highest card. The cards rank as at whist (ace highest), except in the case of straightflushes, when ace may be highest or lowest—i.e. ace, king, queen, knave, ten, or five, four, three, two, ace form the highest and lowest straights respectively. If more than one player holds a straight flush the sequence headed by the highest card wins; the same as between two straights. Similarly, the highest fours win, the highest triplets in triplet hands; in the case of fulls, the highest holds the highest wins. As between two flushes, the highest card wins; if these tie, the next highest, and so on. If two players each hold two pairs, the highest pair wins; if the two pairs tie, the remaining highest card wins; with one pair, the same. If none of the players remaining in the game hold any of the above combinations, each shows his highest card; if there is a tie, the next highest, and so on. There are numerous varieties in the way of playing, for which treatises on poker should be consulted. The above describes the simplest form of Draw Poker, the game most commonly played. See books by Keller (New York, 1887) and Guerndale (1889).

Poker-drawings, the name given to designs (after well-known pictures generally) burnt into lime-tree or other wood with 'pokers,' which rather resemble plumbers' tools. The name is chiefly applied to 'poker,' 'pyrotechnic,' or 'pyrographic' artists were John Cranch (1751-1823), Smith of Skipton, and Dr Griffiths, the master of University College, for whose chapel he executed an altar-piece for Carlo Dolce. At Knole are two poker-drawings ascribed to Salvador Rosso. A similar process of adorning ships' cabins, table-tops, &c., was patented in 1865.
Polish (Polski), a town of India, in the Rajput state of Jodhpur, 70 miles NW. of Jodhpur.

Poland, the most important naval station of Austria-Hungary, is situated near the southern extremity of the peninsula of ISTRIA, 105 miles by rail S. of Trieste. The harbour is thoroughly sheltered, deep, and spacious enough to accommodate the largest fleet. The town is protected by a fortified belt, and is overlooked by the citadel, by which it and the bay are commanded. The arsenal employs about 2400 men. There are also artillery and powder stores, docks, slips, &c.

The cathedral dates from the 15th century. Pola is also a shipping port, exporting wood, fish, sand, and building timber, and importing wine, canvas, and bricks. Pop. (1850) 27,173; (1890) 39,273, of whom 10,000 belonged to the garrison. Founded traditionally by the Colchians who were sent in pursuit of Jason, Pola was destroyed by Augustus, but rebuilt at the request of his daughter Julia, on which account it was named Piaetas Julia. At the beginning of the 3d century it had 30,000 inhabitants, and was a station of the Roman fleet. It was destroyed in 1297 by its Venetian masters, who had conquered it in 1148, and afterwards ruledit for 257 years. After routing the Venetians in see fight off the town, once more ravaged it. But it only passed from Venice in 1797 to Austria, who chose it as her chief naval harbour in 1848. It contains numerous interesting Roman remains, among them a well-preserved amphitheatre, 450 feet long and 360 broad. A temple and several ancient gates are also extant. See Allison's Antiquities of Pola (Lond. 1819), and Jackson's Dalmatia, the Quarnaro, and Istria (1887).

Polabians, an ancient Slavic race, belonging to the same group as the Poles, occupying the country of the Leve Elbe. They have long been Germanised, and their language is now extinct. The term is sometimes used in a wider sense for all Slavonic peoples west and north-west of the Oder and the Erzgebirge. See Slavs.

Pola, a species of vessel in use in the Mediterranean and Indian seas, with jib-lugs; the fore- and main-masts being of one piece ("pole-masts"), and the mizen-mast with a top and topmast.

Pola. See Poloaise.

Poland (called by the natives Polski, a word of the same root as Pole, "a plain"), a former kingdom of Europe, was, immediately previous to its dismemberment, bounded on the N. by the Baltic Sea from Danzig to Riga, and by the Russian provinces of Pskov and Pskov; on the E. by the Russian provinces of Smolensk, Ternopol, and Kharson; on the S. by Bessarabia, Moldavia, and the Carpathian Mountains; and on the W. by the Prussian provinces of Silesia, Brandenburg, and Pomerania. Its greatest length from north to south was 713 English miles, and from east to west 693 miles, embracing an area of about 292,000 English sq. m. (40,000 larger than Austria-Hungary is now); an area which in 1890 had a population of 24,000,000. This extensive tract forms part of the great European central plain, and is crossed by only one range of hills, which rise from the north side of the Carpathians and run north-east through the country, forming the watershed between the rivers which flow into the Baltic and Black Sea. The soil is mostly a light fertile loam, well adapted for cereals, though here and there occur extensive barren tracts of sand, heath, and swamp, especially in the eastern districts. Much of the fertile soil is rich pasture-land, and much is occupied with forests of pine, birch, oak, &c. Rye, wheat, barley, and other cereals, hemp, timber, honey and wax, cattle, sheep, and hogs, vast mines of salt; and a little silver, iron, copper, and lead constitute the natural riches of the country; and for the purposes of commerce the Vistula, Dnieper, Dvina, and their tributaries afford great facilities.

The kingdom of Poland, during the period of its greatest extent, after the abolition of the grand-duchy of Lithuania at the close of the 14th century, was subdivided, for purposes of government, into about forty palatines (Pol. województwa), which were mostly governed by hereditary chieftains. The people were divided into two great classes—nobles and serfs. The nobility was divided into two classes, to which were the privileged and governing classes, included the higher nobles, the inferior nobles (a numerous class, corresponding to the knights and gentry of other countries), and the clergy, and numbered in all 200,000; the serfs formed the agricultural labourers, and were attached to the soil. Their condition is described by all travellers as a very pitiable one. Such trade as the country had was mostly in the hands of the Germans and Jews. The nobles were the proprietors of the soil, and appropriated the larger portion of its products, the serfs being left with a bare subsistence. The system was calculated, and hospitable, but quarrelsome, and generally preferred their own interests to that of their country; the serfs (originally called Knize; Lat. Knieten) were sunk in poverty and ignorance, and the present system is that of the old. In the Poland of former days consists of Poles, Lithuanians, Germans, Jews, Malo-Russians, Romanians, Gypsies, &c. The Poles, who number 10,000,000, form the bulk of the population; the Lithuanians, 2,400,000 in number, inhabit the north-eastern part of the country; the Germans, numbering more than 2,000,000, live mostly in the towns; the Jews are very numerous, being reckoned at 2,200,000. Of Roman Catholics there are about 9,400,000; of members of the Greek Church (including Uniates), 7,900,000; of Protestants, 2,300,000; the rest are Jews, Armenians in Galicia, &c.

History,—The Poles are ethnologically a branch of the Slavs (q.v.). The name appears first in history as the designation of a tribe, the Poliani, who dwelt beyond the Oder and the Vistula, being surrounded by the kindred tribes of the Masovii, Kujavi, Chrobates, Silesians, Obotrites, and others. In course of time the name Polani became pre-dominant. There is no real Polish history till the reign of Mieszczlaw (962-992); up to the period of this sovereign we have only fables. He became a convert to Christianity, and Poland took rank as one of the political powers of Europe. Mieszczlaw acknowledged himself to be the feudatory of Otton of Germany. In his time the first Polish bishopric was founded at Posen. He was succeeded by his son Boleslas I. (992-1025), who extended his kingdom beyond the Oder, the Carpathians, and the Dnieper. He was recognised as king by the German emperors. After a period of anarchy he was succeeded by his son Casimir (1040-58), whose reign, and that of his warlike son Boleslas II. (1058-1101), although brilliant, were of little real profit to the country. The latter monarch having murdered the Bishop of Cracow with his own hand, Poland was laid under the papal interdict, and the people absolved from their allegiance, whereupon the Poles fled to Hungary. For two hundred years from this time Poland was only a duchy. Boleslas III., surnamed the "Wry-mouthed" (1102-38), an energetic monarch, annexed Pomerania.

In the time of Casimir II. (1177-94) we have the senate established, which was formed from the bishops, palatines, and castellans. His death was
the signal for a contest among the various claimants for the throne, which was speedily followed, as usual, by a division of the country, and during this disturbance Pomoronia emancipated itself from Polish rule. In 1226 the Teutonic Knights were summoned by the Duke of Masovia to aid him against the pagan Prussians; but they soon became as formidable enemies to Poland as the Prussians, and conquered a large part of Podolia and Lithuania. The Mongols swept over the country in 1241, committing great devastations, and defeated the Poles in a battle at Liegnitz. Many districts of the country were now colonised by Germans, and numbers of Jews took refuge in Poland. The Germans obtained great privileges from the Polish king, who was one of the few to endure the Teutonic burgenon. The reign of Ladislaus the Short (1305–33) is important, because in his reign the first Polish diet (1331) was summoned at Checiny. In conjunction with Gedymin, Grand-duke of Lithuania, a vigorous war was carried on against the Teutonic Knights. His son, Casimir the Great (1333–70), increased the prosperity of Poland. Commerce was active, and Danzig and Cracow joined the league of the Hansa. In 1347 was enacted the celebrated Statute of Wilscha, the foundation of Polish law; in this reign also Galicia was united to Poland. With Casimir the dynasty of the Piastas became extinct, after a rule of 510 years, according to the old Polish chroniclers. His nephew, Louis, king of Hungary, succeeded him by the will of the deceased monarch and the election of the diet. On his death without male heirs the succession fell to his daughter Jadwiga or Hedwig, who was induced by the diet to marry Jagiello, Grand-duke of Lithuania, who founded the dynasty of the Jagellons (q.v.; 1386–1572), and first united Lithuania and Poland, thus doubling the extent, though not the population, of the kingdom. In 1410 the Teutonic Knights were defeated in the battle of Grunwald. His son, Ladislaus, who was also chosen king of Hungary, fell at the battle of Varna in 1444 fighting against the Turks. Casimir, who succeeded, recovered West Prussia from the Teutonic Knights and compelled them to do homage for East Prussia. In 1454 was held the diet at Nieszawa, at which the celebrated statute was enacted which conferred great privileges upon the Polish nobility. The brief reigns of Casimir's two sons were marked only by the increased power of the diet, which had by this time absorbed all but the accouts of supreme authority, the great lords of Poland from a monarchy into an oligarchy. The king thus possessed but little power beyond what his personal influence gave him.

Sigismund 1. (1506–48), also son of Casimir IV., had a long and prosperous reign, Poland being at that time the dominant country of eastern Europe. Very different opinions have been held about this monarch, some Polish historians praising his government, while Bohrnskynski and others consider him to have been a weak man. His court was filled with factions fomented by his wife, Bona Sforza, daughter of the Duke of Milan, a malignant and avaricious woman. The doctrines of the Reformation penetrated to Poland, and were a source of fresh discontent. In a war with Basil, the Grand-duke of Russia, Sigismund lost Smolensk, but he was partly compensated by obtaining lordship over Moldavia. In 1529 Sigismund issued a legal code for Lithuania, which forms an important monument of Polish law. In 1537 occurred the first rokok, or rebellion of the nobility against the kingly authority. Sigismund was about to set out to Wallachia, and was obliged to make several concessions before they would accompany him. In 1548 the king died at the advanced age of eighty-two.

He was succeeded by his son, Sigismund II. (1548–72), otherwise called Sigismund Augustus, but this prince was not elected till a debate had taken place about his marriage. He had secretly espoused as a widower a widower of the Granhuse Radzizzill, and the nobles required the union to be annulled, because they fancied that the country

![Poland and Lithuania map](image-url)
would gain more by a foreign alliance. Sigismund, however, carried his point, and his wife was crowned in 1550, but died soon after, not without suspicions of having been poisoned by her mother-in-law, Bona, who in this reign left Poland for her native country, carrying with her a vast amount of treasure. The quarrel between Protestants and Romanists raged fiercely, and the circumstances of the time caused it to spread rapidly in Poland. We hear of persons being burned to death for their adhesion to it. Sigismund showed great indecision in the matter. In 1568, by the diet of Lublin, Lithuania was first declared indissolubly to Poland, and from this time there was to be but one diet for the united realm, and Warsaw, for greater convenience, became the capital. Poland also gained Livonia. In 1572 the king died. In the diet held the year after at Warsaw it was enacted that there should be toleration for all religious opinions, but the nobles were still to have power over their serfs in spiritual matters.

The population almost doubled itself, but the nobles became every year more impatient of restraint, and the crown was now virtually elective. The command of the government was divided into the ordinary diet and the post, or deputies of the nobility, together with the higher nobility, sat in one chamber. The king had the right of summoning the diet, which only lasted for six weeks, and its decisions were required at a later stage, as we see in the splendid triumph of the idea of Saxon supremacy. The unanimity in voting is thoroughly Slavonic, and is to be found in the old Russian folk-notces. The right of forbidding the passing of any measure was called in Poland the liberum veto (in Polish, nie pozwalanie), and sought as legitimate to a stagnant state still. It was employed by many of the corrupt Polish nobles to avoid the detection of their malpractices or to gratify their private malice, and hastened the ruin of the country.

The diet of 1573 elected Henry of Valois (III. of France, q.v.), a workman, who fled in the most ludicrous fashion from the country after a reign of about five months, and was succeeded by Stephen Batory (1575–86), voivode of Transylvania, one of Poland's best kings, who carried on war successfully against the Russians, and compelled them to cross the Dnieper. Batory, the Cossacks of the Ukraine into regiments of frontier soldiers, Batory, who had no heirs, was succeeded by Sigismund III. (1586–1632), the son of Catharine, sister of Sigismund II., who had married John Vasa, king of Sweden. He signed the pacula conventa, as the agreement between the Poles and their king was named, and an alliance offensive and defensive was made between Poland and Sweden. Constant disputes took place between the king and the diet, and he was a great persecutor of the Dissidents, as the Protestants were called. Sigismund assisted the claims of the false Demetrius, who was assassinated at Moscow in 1606, and we find the Poles afterwards taking that city and causing Ladislaus, the son of Sigismund, to be crowned czar; but he was soon defeated, and ultimately fled to Turkey, where the Romanovs ascended the throne in the person of Michael. Nor was Sigismund successful in his attempts to get the crown of Sweden. He died in 1632, and was followed by his sons Ladislaus IV. (1632–48), the electors of Saxony being naturally the closest to the crown, and his brother John, who was elected king; but his election was opposed by Austria and Russia, and in his place was chosen Augustus III. (son of the last sovereign), a weak and incapable man. The condition of the country now continued to decay. During the reign of this dynasty Wallachia and Moldavia were taken by the Turks from the Polish protectorate, Livonia was conquered (1655–21) by Sweden, and Brandenburg established itself in complete independence (1657). In 1652 Sicienski, the convert of the Jesuits, was accepted by the liberum veto. The Cossacks had been gored into rebellion by oppression and religious persecution, as they were members of the Greek church, and finally went over to Russia. This occurred in the unfortunate days of John Casimir; and during the same reign Poland was attacked simultaneously by Russia, Sweden, Brandenburg, and the Cossacks; the country was entirely overrun, Warsaw, Wilno, and Lenberg taken, and the capital taken. Many of the Polish nobles behaved with great treachery, but the invaders were finally driven out. In 1660 Livonia was ceded to Sweden. In 1667, by the treaty of Andruszow, the territory beyond the Vistula was ceded to Russia. John Casimir abdicating in 1668, and retired to France, where he died in 1672.

Michael Wisniewiecki (1668–74), son of a famous general, but a weak and very insignificant man, was elected king—it is said almost against his own will. He was a mere puppet in the hands of his subjects. A war with Turkey was concluded by the ignominious peace of Buczac in 1672, by which the town of Kamienieck remained in the hands of the Ottomans. But the senate rejected the treaty; the Polish army was reinforced, and the Turks expelled; and Maria, the widow of Sigismund, who ruled the Turks at Chezmin the following year. Michael died suddenly in 1674. After some dissensions concerning the election of a successor, John Sobieski (q.v., 1674–96) was chosen, but his reign, although adorned by the splendid triumph of Vienna (1683), was productive of little good to his country, chiefly through the continual dissensions of the nobles. Sobieski's successor the Prince of Conti was legally elected and proclaimed king; but Augustus II. of Saxony, who reigned for seven years, was driven out by the House of Austria, entered Poland at the head of the Saxons, and succeeded in obtaining the throne. Augustus showed little sympathy with his Polish subjects; he promised to reconquer for Poland her lost provinces, but this promise was chiefly made as an excuse for keeping his Saxan army in the country, in violation of the pacula conventa. His war with the Turks restored to Poland part of the Ukraine and the fortress of Kamienieck; but that with Charles XII. brought nothing but misfortune. Cracow was taken in 1702; Augustus was deposed, and Stanislaus Leszyenski (1685–90), was practically in power, while his brother Stanislaus, who had been elected in his place, "all the courts of Europe acknowledged Stanislaus, except that of Peter the Great; and, when the latter defeated Charles at the battle of Pultowa in 1709, Leszyenski was compelled to leave the country. He returned. In this reign Poland lost Courland, one of its siefs, which was given by the Empress Anna to Biron, her favourite. Religious fanaticism was also rampant. The Dissidents were very much persecuted, and a riot having taken place in 1724 at Thorn, several of the leading citizens, including the burgomaster, were put to death. In 1733 a law was passed excluding them from all public offices. This same year the contemplative Augustus died. At the instigation of some of his supporters, Stanislaus Leszyenski, who was then residing in France, succeeded, and by some means returned to Poland and was elected king; but his election was opposed by Austria and Russia, and in his place was chosen Augustus III. (son of the last sovereign), a weak and incapable man. The condition of the country continued to decay. During this reign Turkestan was ceded to Russia, and the more enlightened Poles, seeing the radical defects of the constitution, the want of a strong government, and the dangers of the liberum veto, entered into a league for the establishment of a well-organised hereditary monarchy. The convent parlementary party was now generally hostile to the Turkish influence, while the reformers supported the Jesuits in their exclusion of dissenters.
from public offices. In 1764 Stanislaus Augustus Poniatowski was elected king, chiefly through the intrigues of the Empress Catharine. Although a man of refined manners, he was weak, and not fitted to serve the country at such a crisis. The reforming, or Czartoryski party (so called because it was headed by a member of this celebrated family), had succeeded in abolishing the liberum veto, and effecting many other improvements; but they at the same time more severely oppressed the Dissidents, whom the Russians pretended to protect.

The Confederation of Bar (so called from Bar in Podolia) was now (1768) formed by a few patriots, an army of about 8000 men was assembled, and war declared against Russia. But they were not successful, and a bold attempt to carry off the king also failed. Frederick the Great of Prussia, who had formerly gained the consent of Austria to a partition of Poland, made the same proposal to Russia in 1770, and in 1772 the first partition was effected. The territories seized by the three powers were as follows:

<table>
<thead>
<tr>
<th>Country</th>
<th>English sq. miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>42,000</td>
<td>1,800,000</td>
</tr>
<tr>
<td>Prussia</td>
<td>38,000</td>
<td>1,000,000</td>
</tr>
<tr>
<td>Austria</td>
<td>27,000</td>
<td>2,700,000</td>
</tr>
</tbody>
</table>

The whole country was now aroused to a sense of its danger; and the diet of the diminished kingdom laboured to amend the constitution. In 1788 a remarkable diet was opened which lasted four years. Many changes were introduced. The liberum veto was formally suppressed, and the throne was declared hereditary. The burgurers were sent to depute to the diet on the same terms as the nobles; the peasants were not set free, but their condition was improved; and the Dissidents were granted complete toleration, although the Roman Catholic was declared to be the dominant religion. In this they were encouraged by Prussia, whose king, Frederick William, swore to defend them against Russia. The new constitution was promulgated May 2, 1791. But some of the nobles were discontented at the loss of their privileges by the new order of things, and formed in 1792 the Confederation of Targovia (q.v.), and at their instigation Russian troops invaded Poland and Lithuania. Prussia now joined the Russians, and a second fruitless resistance to the united troops of Prussia and Russia, which was headed by Joseph Poniatowski (q.v.) and Kosciusko (q.v.), was followed by a second partition (1793) between those two countries as follows:

<table>
<thead>
<tr>
<th>Country</th>
<th>English sq. miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>96,000</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Prussia</td>
<td>72,000</td>
<td>1,100,000</td>
</tr>
</tbody>
</table>

Cracow, with a small surrounding territory, was declared independent under the protection of Austria. Alexander I. gave the Poles a constitution, including the independence of the ministry, a separate army, and liberty of the press. General Zajacek was appointed viceroy, and the Grand-duke Constantine took command of the army. For some time matters seemed to go on smoothly, but a spirit of discontent soon developed itself. Complaints were made that the freedom of the press was interfered with, and secret societies were formed. An insurrection broke out in November 1830; the grand-duke was obliged to quit the city, and General Chlopicki was appointed dictator. Early in 1831 a large Russian army, under Diebitsch, entered the country. Chlopicki

King Stanislaus resigned his crown, and died at St Petersburg in 1798. He lies buried in the Roman Catholic church there.

The main causes of the fall of Poland appear to have been (1) the want of patriotism and cohesion among the nobles, each pursuing his own interests, and the country thus being divided among a number of petty tyrants; (2) the want of a national middle class, the trade of the country being almost entirely in the hands of Jews and Germans; (3) the intolerance of the Jesuits, who persecuted on the one hand the Dissidents, which caused them to sympathise with Prussia, and on the other persecuted the Orthodox inhabitants of the eastern provinces and the Coassarks, who thus looked to Russia; (4) in a less degree than the first three causes, the weakness of character of the kings—though the throne was not entirely in their hands—confessed that they had no fair play; (5) the want of natural frontiers.

The subsequent success of the French against the Russians and the promises of Napoleon to reconstitute Poland roused him round him the Poles, who distinguished themselves in several campaigns against their old enemies; but all that Napoleon accomplished in fulfilment of his promise was the establishment, by the treaty of Tilsit (1807), of the duchy of Warsaw, chiefly out of the Prussian share of Poland, with a liberal constitution and the Elector of Saxony as its head. In 1806 Western Galicia was taken from Austria and added to the duchy, but the advance of the allied army in 1813 put an end to its existence. After the cessions by Austria in 1809 the duchy contained 58,200 English sq. m., with a population of about 4,000,000. Danzig was also declared a republic, but given back to Prussia (February 3, 1814).

The division of Poland was rearranged by the Congress of Vienna in 1815; the original shares of Prussia and Austria were diminished, and that part of the duchy of Warsaw which was not restored to Prussia and Austria was united as the kingdom of Poland to the Russian empire, but merely by the bond of a personal union (the same monarch being the sovereign of each), and the two states being wholly independent of each other. The remaining parts of Poland were incorporated with the kingdoms which had seized them. The partition of Poland as thus finally arranged was as follows:

<table>
<thead>
<tr>
<th>Province</th>
<th>English sq. miles</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Courland</td>
<td>220,000</td>
<td>10,000,000</td>
</tr>
<tr>
<td>Vilkija</td>
<td>26,000</td>
<td>2,000,000</td>
</tr>
<tr>
<td>Minsk</td>
<td>26,000</td>
<td>2,000,000</td>
</tr>
</tbody>
</table>
| Mohileff, Valholya, Klef, Podilia, and the Kingdom of Poland (see below). Of these portions of the original kingdom of Poland now belonging to Russia it must be remarked that Courland was ceded to Russia in the reign of Catherine II. by the free action of the inhabitants; Klef had belonged to Russia by conquest since 1667.

Kosciusko was appointed viceroy, and the Grand-duke Constantine took command of the army. For some time matters seemed to go on smoothly, but a spirit of discontent soon developed itself. Complaints were made that the freedom of the press was interfered with, and secret societies were formed. An insurrection broke out in November 1830; the grand-duke was obliged to quit the city, and General Chlopicki was appointed dictator. Early in 1831 a large Russian army, under Diebitsch, entered the country. Chlopicki
resigned his dictatorship, and Prince Czartoryski was appointed president of the provisional government. From January 1831 till 8th September of the same year a series of sangri»ry engagements took place, in which the Poles were at first successful. On the 8th of September, however, Paskevitch (q.v.), who had succeeded Lubitsch, took Warsaw, and the insurrection was at an end. The Poles had not succeeded in obtaining any assistance from foreign powers. From this time the independence of Poland was suppressed, and in 1832 it was declared an integral part of the Russian empire. A separate administration was headed by a vicerey chosen by the czar; the constitution was annulled, and a strict censorship of the press was established. Many of the literary treasures were carried off to the public library of St Petersburg. Slight outbreaks occurred in 1846, which were severely repressed. Simultaneous disturbances in the Russian and Austrian portions of Poland met with the same fate. Their leaders in Prussia were imprisoned, but released by the revolution of 1848 at Berlin. In no part of the lost province has the work of denationalisation been more thorough than at Warsaw, where it proceeded quietly, but thoroughly. In Galicia the peasants at the same time massacred many of the nobles. On the 6th of November 1848 the republic of Cracow was incorporated with Austria.

After the accession of Alexander II. in 1855 the country was again thoroughly reorganised. An amnesty brought back many of those who had been expatriated, and various other reforms were hoped for. On the 29th November, on the thirtieth anniversary of the insurrection, many political manifestations took place, but in a formless way elsewhere. On the 6th a rebellion took place, and some persons were unfortunately killed. Warsaw was now declared in a state of siege. In June 1862 an attempt was made to assassinate General Luders, the governor, who was succeeded by the Grand-duke Constantine, the brother of the emperor, the Marquis Wielopolski being appointed chief minister. Meanwhile Alexander II. had made great concessions; the public offices of the country were to be filled by Poles; the Polish language was to be the official one, and municipal institutions were granted to Warsaw and the chief cities. The people, however, received these overtures sullenly, and on the night of January 15, 1863, a secret conscription was held, and those suspected of disaffection to the government were seized in their beds to be enlisted. Attempts were made to assassinate the grand-duke and other Russian officials, and Lithuania and Volhynia were also declared in a state of siege. The committee of the National government issued its first proclamation in February 1863; and a week afterwards Mieroslawski raised the standard of insurrection in the north-east, on the frontier of Posen. The committee (Rzecz') had secret sessions, and was for a long time able to defy the Russian government: its emissaries, called stilettoksi, put to death many obnoxious persons and Russian spies. It also issued two Conclusions from time to time, and many districts of Augustovo, Radom, Lublin, Volhynia, and Lithuania were speedily in insurrection. It was a mere guerrilla war, and no great or decisive conflicts took place; but the sympathy of Europe was largely enlisted on behalf of the Poles. Incendium and murder were rampant; and at last, with the assistance of Prussia and the secret support of Austria, the czar's troops succeeded in taunting out (1864) the last embers of insurrection. Langiewicz, one of the leaders who had escaped, was captured, and murdered in 1878, but at length made his escape into Galicia. From the time of the suppression of the insurrection the kingdom of Poland has disappeared from all official documents. All education in the university and the schools is now carried on in the Russian language.

Among histories may be recommended Histoire de Pologne, by Lelewel (Paris, 1844); Geschichte Polens, by Köppel and Caro (vols. i.-vi., Gotha, 1840—88); Dieje Polakie w Zeitschriften, by Bobrzyński. See also Count Motie's Poland (Eng. trans., 1858), and the present writer's PoZand (1893). For maps of Poland at various dates, see, besides that given above, the statistical maps on p. 646.

RUSSIAN POLAND.—The so-called 'Kingdom of Poland,' united to Russia in 1815, had its own constitution till 1830, and a separate government till 1844, when, after the suppression of the revolt, the last visible remnant of independence was taken away. The administration was at first given to eight military governors, and then to a commission sitting in St Petersburg. Finally, in 1868, the Polish province was absolutely incorporated with Russia, and the ten governments into which it was divided are grouped with the governments of Russia proper. In 1867 the area of the 'kingdom' was about 4,500,000 sq. m., with a population of 5,700,000, of whom 4,300,000 were Roman Catholics, 780,000 Jews, 260,000 Greek Catholics (mostly United), and the rest Lutherans or other Protestants. In 1890 the ten Polish provinces—Kalisz, Kielce, Loniza, Lublin, Piotrkow, Plock, Radom, Siedlice, Sarnecz, and Warsaw—had a population of about 8,105,000. The several areas and populations of these governments will be found in the table at Russia. About 10,000,000 still here and in Prussia and Austria speak the Polish tongue. The surface and roll of the Russian Polish province resembles that of the rest of old Poland; the commerce is still mostly in the hands of the Jews.

POLISH LANGUAGE AND LITERATURE.—The Polish language is one of the most widely-spread branches of the Slavonic family; it forms the western branch together with Bohemian and Sorbian or Lusatian Wendish. Like all the Slavonic languages, it is highly inflected, having seven cases, and, by means of the so-called 'aspect,' expressing very delicate distinctions of meaning in the verb. Like Russian, however, it lacks the imperfect and aorist which are found in Bulgarian and Serbian. It has a rich vocabulary and a great power of compound words. It resembles the Old Slavonic in having two nasals, like the French en and in; these are found nowhere else among Slavs except in a Bulgaro- German dialect. After the introduction of Christianity Latins exercised a great influence on its vocabulary and literature, and subsequent to the 14th century it adopted into its vocabulary numerous German words. Already in the 16th century Polish was a highly cultivated language, and began to supplant Latin, until then the language of the state and of the learned. The best Polish grammars are those of Malecki, Gramatyka Historyczno- Porownawcza Jezu Polskiego ('Historico-comparative Grammar of the Polish Language,' Lemberg, 1879), and G. W. Wassy's Vergleichende Sprachlehre der polnischen Sprache (Berlin, 1845); the most comprehensive dictionary is that of Linde (new ed. Lemberg, 1854—60); that of Banitke (2 vols., Breslau, 1896) is good, and so also is the English-Polish dictionary published at Berlin in 1848.

The history of Polish literature is divisible into five distinct periods. (1) From the earliest times to the middle of the 16th century, the epoch of the Reformation. The Poles, unlike most of their Slavonic kindred, are poor in legendary and cepitricel and number of the early literature is in Latin. Casimir III. (q.v.), surnamed 'the Great,' did more than any other early Polish
monarch for the encouragement of literature, and among other things founded the university of Cracow, which has continued to be the centre of intellectual activity in Poland. The oldest literary monuments is a hymn to the Virgin Mary, ascribed to St Adalbert. The MS, in which it is preserved is dated 1408. Belonging to the middle of the 14th century is the so-called psalter of Queen Margaret, discovered at the turn of the 19th century, which has been edited by Professor Nehring; there is also the Bible of Queen Sophia, which has come down in an imperfect copy, and is said to have been written about 1455; it has been edited by Professor Malecki. Writers of Latin chronicles were Martin Ciurl (died 1560 and 1582); Kadulek (1160-1225), and Jan Dlugosz or Longiussi (1415-80), all of whom were ecclesiastics. The last is also worthy of remembrance as an able diplomatist. Jan Laski, Archbishop of Gnesen (1457-1531), published a valuable collection of the oldest Polish laws, Communie Instructi Polonicie Regni Privilegij. In 1474 the first printing-press was established at Cracow by Günther Zainer; the first book in the Polish language was published there in 1521. In 1543 died the great astronomer Nicholas Copernicus. Some other specimens of other works of the 16th century will be found collected in the valuable work of Nehring, Altpolnische Sprachdenkmaler (Berlin, 1887).

(2) The second period of Polish literature embraces that which is called the golden age (1548-1606). The series of poets begins with Nicholas Roy (1583-69); commonly called the 'father of Polish poetry,' who spent his life at the courts of the Sigismunds. He was a Protestant. His best work is Zwiewnice i albo zygot Poczeciego Chlojowiecka ('The Mirror: or the Life of an Honourable Man,' 1567); he also wrote a play on the subject of Joseph. Although his language is rough and careless, there is much shrewdness and satire in his writings. Jan Kochanowski (1530-84), called the prince of Polish poets, has left a great deal of verse, the most beautiful of which are his Treny or Lamentations on the death of his father. His Uganda, a historical translation of the Jerusalem Delivered of Tasso, Szarycz (1581) introduced the sonnet into Polish. Szymonowicz (1557-1629) was a writer of good pastoral poetry ('Sielanki'), as was also Zimowycz (1629), a native of Lemberg. Sebastia Knioowicz, called Acorna (died 1602), is celebrated as a satirist and descriptiver poet. The Reformation made rapid progress in Poland; many of the nobility were Calvinists, and the Socini became to reside in the country. Translations of the Bible appeared, but the Jesuit reaction soon made itself felt, especially under the influence of Skarga (1552-1612), renowned for his pulpit eloquence. Among the historians of this period the most celebrated are Martin Bielski, whose Chronicle was continued by his son Joachim; Latka Gornicki (died 1591), author of a history of the Polish crown (Dziwce w Koronie Polskiej), was a Jesuit; Cracow (1557) and 1582), whose Chronicle of Lithuania (Königsh. 1582) is an admirable work; and Papatzek (died 1614).

(3) The third period of Polish literature, also called the Macaronic (1606-1764), is coincident with the classic period in Latin literature and obtained for the language a footing in Poland about 1566, through the influence of Cardinal Hüss, soon got possession of the schools, and seriously checked the intellectual development of the nation. The literature of the period is for the most part poor, consisting mainly of bombastic panegyric; the language being corrupted by Latinisms and frequently by the introduction of whole Latin sen-

...tenences—hence the term Macaronic. To this period belong Casimir Sarsibeski, known by his Latin name Sarbitius (1560-1610), a celebrated writer and poet. He was a bishop and a poet of learning who has been called the author of the poem Wysna Chrystianata, or War of Chocim, long preserved in manuscript; Kochowski (died 1699), a soldier-poet, who has left some sprightly odes; Twardowski (died 1660), a very prolific writer, author of a poem on Ludzislan (Lithuania); (1610-1650), who has left some bitter satires reviving his name as a genius, and who was betrayed to the Swedes; Choseiski, the translator of Lucan; Morsztyn, the translator of Corneille; and Elizabeth Druszaacka (died 1760), whose writings show some feeling for nature. History again begins in fashion, in spite of having been written in the golden age in Polish; we may mention Starowowski; (died 1656), author of Poloniae sive Status Regni Polonicie Descriptio (Wollenbutfett, 1656), and other works; Kojałowicz, a Jesuit (died 1617), who wrote a History of Lithuania; and Kaspar Niesiecki, a Jesuit (died 1744), whose Krono Polonae (4 vols. Lemb. 1728-43) is the most important work on Polish heraldry.

(4) The fourth period is that of the reign of Stanislaus Poniatowski and the dismemberment of Poland, till the rise of romanticism (1764-1822). This period marks the transition partly to the influence of French culture, partly to the development of literature and science by King Stanislaus, the princes Czartoryski, Jabłonowski, and other noblemen, and the educational reforms of Stanislaus Konarski (1700-73). The good work begun by Konarski was carried on by Kopeyzyński (1735-1817) Ignacy, who was the first to establish on a scientific basis the grammar of the Polish language in his Grammarka Narodowa; other authors were Bohomolcz and Zablocki, who adapted a great many French pieces for the stage. But the best writer for the stage was a man who belonged to a later period. The most noted dramatist, however, of this time, who may perhaps be called the real founder of the Polish stage, was Boguński (1739-1829), who wrote above eighty plays, the majority of which, under the title of 'Dziela Miejski,' were published at Warsaw (9 vols. 1820). The most conspicuous poet of this time was Ignacy Krasicki (1735-1801), who tried all kinds of literature—an epic on the war of Chocim, a weak production, and some satires and fables. We must also mention Trembecki; Wojciech Jagloń, the grocer; Grosz, and Weyzy Adal. Naruszewski, who was a macaronic poet, but he wrote a valuable History Narodu Polskiego ('History of the Polish People'), which he carried down to the year 1836. In 1801 the historian Tadeusz Czéki, Franciszek Dunowicz, and Bishop Jan Albertrandy founded at Warsaw the 'Society of the Friends of Knowledge,' which especially under the auspices of Stanisłav bore good fruit till it was dissolved in 1832, when its library of 50,000 volumes was carried off to St Petersburg. At the same time Józef Ossoliński, Hugo Kołataj, and Konstanty Potocki, a Polish poet and writer, exercised a great influence on the renunciation of the national spirit. Karpinski (1745-1825) was a very popular poet as a writer of sentimental elegies and idylls, and Woroniez (1757-1829) was celebrated both as a poet and divine. Niemecwiecz (1757-1841) was a statesman and wrote the first of his historical songs (Spiewy Historyczne). Lastly, as the great precursor of the romantic school, must be mentioned Kazimierz Brodziński (1791-1835), whose idyll Wiesław has been much admired.

(5) The fifth period comprises from 1822 to the present time; the era of romanticism, dating from the appearance of Mickiewicz, the greatest Polish poet. At Wilno, which after 1815 became the centre
of Polish literary activity, several young men united, with Adam Mickiewicz (1798-1855) at their head, in a crusade against the still dominant French school of literature. After a short stay in Russia, Mickiewicz emigrated, in 1809, and spent the last part of his life at Paris. He died at Constantinople, whether he had gone on a political mission at the time of the Crimean war. We have only space to mention some of his chief works, his Ballads, Sonnets, Konrad Wallenrod, and Pan Tadeusz; the last of which were translated into English, and are now included in the English language. Anton Malczewski (1792-1826), remembered by his Maria, a pathetic story of the Ukraine, was a prominent poet of what has been called the Ukraine school; Goszcynski (1806-76) was author of the narrative poem Zamek Kaniowski; Bohdan Zaleski, author of Dukh od Stepni; others are Odyncie, the friend of Mickiewicz, Siemiencki, Garzyński, Gaszynski. The two names most worthy to be placed by the side of that of Mickiewicz are those of Sigismund Krasiński (1812-59), author of the strange poem Nadwórna Komedia (the Undivine Comedy), and Julius Słowacki (1809-49). Most of these men belonged to what was called the Polish Emigration, whose headquarters were at Paris. Of the Polish novelists we have only space to mention the prolific Józef Ignacy Kraszewski, whose works amount to 312, and Henrik Sienkiewicz. The most original writer for the stage whom the Poles have produced is Count Alexander Fredro (1783-1876); he is a thoroughly national writer; although French influence is visible in his pieces, the characters are Polish. Many distinguished historical writers belong to this later period, of whom we may mention Janchim Lelewel (1786-1862), the author of many works of the greatest value, Sniżski, Schmitt, Sznajchla, and Michal Bohurzynski, professor in the university of Cracow. By these means the history of Poland has been treated in all its details with great vigour. Among later poets may be mentioned Pol, Ujejski, and Lenartowicz; Adam Asnyk, the most popular of recent Polish poets; and the poetesses Gabriela Zmichowska (1856-78) and Marya Krzynówek. The history of Polish literature has been written by Bentkowski and Wisniewski. Mention may also be made of Nischmann's Geschichte der Polnischen Literatur (1881), and the present writer's Early Slavonic Literature (1886) and Poland (1893).

Polar Bear. See Bear.

Polar Circle. See Arctic.

Polar Exploration. In scientific geography much of the best work done in the 19th century is due to discoveries made in the Arctic and Antarctic regions. In the former, more especially, not only have new lands been surveyed, but large and important accessions have been made to several branches of natural science. The original motive, however, in England at least, for exploring the Arctic regions was to discover a route to the wealthy countries of eastern Asia, and to share in the traffic monopolised by Spain and Portugal when at the height of their power. Thus arose a double series of attempts, either to coast westward along the north of Europe and Asia, or to sail westward across the Atlantic; the latter being afterwards modified into attempts to coast westward along the north of America. Hence arose the terms ‘North-east Passage’ and ‘North-west Passage.’

Some have traced the history of Arctic exploration to the time of Knipovich, who, in his translation of Orosius (q.v.), inserted an account of the voyages of Oethere and Wulfstan, narrated to him by Oethere himself, who seems to have sailed round the North Cape to Lapland. The voyages of the Norsemen to Greenland (q.v.) and the opposite coast of America in the 10th and following centuries may be regarded as to some extent coming within early Arctic attempts. Cabot’s discovery in 1497 of Newfoundland and Labrador might, however, be termed the first attempt to explore the opposite Arctic regions—for the earlier expeditions claimed on behalf of Portugal must be regarded as mythical. Three years after Cabot, Gaspar Cortereal and his brother made two separate voyages in the same direction, sailing northwards by Labrador, where they were wrecked on 30th May 1498. Bunge, a Danishman, commanded in 1553 by Sir Hugh Willoughby led the way to the North-east Passage. Willoughby sighted Nova Zembla, but he and his men ultimately perished on the coast of Lapland. Chancellor, who accompanied him, landed in Russia near Archangel. Other Englishmen followed, Burroughs (1556), Pet and Jackman (1580), Henry Hudson (1608-9), Wood (1676), but none succeeded in getting much beyond Nova Zembla, though they did good work in exploring the north coast of Europe, Spitzbergen, and the other islands in these seas. In 1594-97 Barents, a Dutchman, led three expeditions, wintering on the north-east coast of Nova Zembla, 1596-97 (see HARENTZ). After the failures of Hudson and Wood in the 17th century, the attempt to sail eastwards came to be considered quite hopeless. In 1683 and 1684, Whidbey, sailing along 81° 30' N., in the neighbourhood of Spitzbergen.

Meanwhile some exploration of the Arctic parts of America had been going on. Frobisher first sailed in 1576, and in 1583-88 the great navigator Davis sailed up the strait bearing his name to 72° 41' N., and coasted the west of Greenland, ‘the land of desolation.’ In a tract of Davis’ published in 1596, there are arguments for a North-west Passage. Hudson, who had tried the North-east Passage, discovered in 1610 the strait and great bay which bear his name. From the size of the latter it was concluded it may be part of the Pacific; but that was disproved by Button, the next English explorer (1612). In 1615-16 Baffin, who went out at first under Bylot, had had some scientific training, proved himself as skillful a navigator as Davis. He found the great northern outlet to Baffin bay, and recorded some important magnetic observations. After the expedition of Fox and James in 1631, which only led to the partial exploration of what then was named Fox Channel, the North American coast was neglected for more than a century.

Russia was naturally interested in the exploration of the Siberian coast, and from Peter the Great’s time took her proper share in the maritime discovery. Behring, after receiving instructions from Czar Peter on his death-bed, sailed from Okhotsk, and discovered the straits which bear his name. In a second voyage (1741) he sailed from Petropolokvivo and explored part of north-west America. Another Russian expedition in 1742 found (but did not succeed in rounding) the most northerly point of Siberia, named from the discoverer Chelyuskin (or Severo); and an earlier one sailed from the Yenisei to 75° 15' N. In 1765 Chitsakoff sailed to Spitzbergen, and finally reached 80° 4' N. The New Siberian Islands were explored by Hedenström in 1809-11, by Anson in 1835, and in 1848-51 by Bering. He explored the Siberian coast between Cape Chugskoi and the Kolyma in 1820-23, and in 1848 Middendorf laid down the unvisited coast in the neighbourhood of Cape Chelyuskin. In the reign of George III, Franklin was a member of an expedition to search for the Northwest Passage, the starting point of this expedition being at the Cape of Good Hope. Captain Phillip (afterwards Lord Mulgrave) sailed in June 1773 to Spitzbergen, where the heavy pack-ice kept him nearly a month from proceeding farther north. Finally he reached 80° 48' N., and Cook, who next made the attempt,
Polar exploration could only penetrate to 70° 45'. The government offered a prize of £5000 to any crew that should reach 89° N. long.; but after those failures there was no effort made till 1806, when Scoresby reached 81° 45' N. immediately above Spitsbergen. In following expeditions Scoresby explored Jan Mayen Island and the east coast of Greenland, largely adding to our knowledge of the physical geography and natural history of the Arctic regions. The expeditions of Buchan and Franklin in 1818, of Clavering in 1823, of Graah in 1828, of De Blosseville in 1832, did not reach higher latitudes than those which preceded them.

To encourage polar exploration on the North American coast the British government had promised a reward of £20,000; yet nothing was done till the Admiralty in 1818 sent out Ross and Parry, who only explored part of Lancaster Sound. Next year Parry alone discovered Prince Regent Inlet, Barrow Strait, and (110° W.) Melville Sound. Following up this line of exploration, Ross in 1829 at last reached a point only 200 miles from Turnagain Point, which had recently been found by another expedition sailing eastward from Behring Strait. Ross then named Boothia Felix, in which the magnetic pole lay, and King William's Island. In 1826–27 Franklin traced the North American coast from the Mackenzie River westwards to Cape Beechey, 860 miles, while his companions, Richardson and Kendall, proceeded eastwards towards the Coppermine River. Deneal and Simpson in 1838 extended the survey of the American coast for about 100 miles, from Point Turnagain. In 1846–47 Dr John Rae explored the west shore of Boothia Gulf, and discovered Boothia Felix to be a peninsula. In 1851 the same explorer surveyed the coast from the Mackenzie River to King William Land, and also the south-east coast of Victoria Land.

The success of Ross led to Sir John Franklin's expedition (left England May 19, 1845), so unfortunate to him and his crew, so famous from the
number of search-parties which it occasioned. His object was to penetrate to Behring Strait from Lancaster Sound (see Franklin, Sir John). In 70° N. lat., 98° 30' W. long., on the west side of King William's Land, the ships were beset, and Franklin died June 1847. The survivors abandoned the ships, and all perished. Many search expeditions were sent out. One of these, under Collinson and M'Clyre, sailed from Plymouth to Behring Strait in 1850. Fixed in the ice on its eastward voyage, M'Clyre's ship was rescued next spring by Sir Edward Belcher, about 60 miles west of Barrow Strait. Belcher now returned towards the Atlantic, and thus M'Clyre with his crew reached England in 1854 after actually traversing the North-west Passage from ocean to ocean. He therefore received the honour of knighthood, and a sum of £10,000 was voted by parliament to him and the crew. One of the last search expeditions was that in the Fox, under Captain (now Sir) Leopold M'Climock, sent out by Lady Franklin in 1857. M'Climock obtained many relics from the

Eskimo of Boothia, and in a cairn in Point Victory found the record which told the story of the expedition. Perhaps we should here note the fact that afterwards, 1879–80, one of the United States search expeditions, under Lieutenant Schwatka, found evidence that Franklin had really completed the discovery of the North-west Passage. Owing to the different Franklin expeditions from Great Britain and the United States the whole Arctic coast of North America was explored almost exhaustively, so that several routes are now completely mapped between Davis Strait and Behring Strait. For commercial purposes, however, the North-west Passage is of no value whatever.

And now to return to the North-east Passage. In 1827 Parry sailed to Spitzbergen, and after much toilsome effort reached 82° 40' N. After that little was done in this region till Sweden began to take an active interest in the exploration, under the active guidance of Professor (afterwards Baron)
Nordenskiöld, who in 1838-72 did much exploring work in the Spitzbergen islands and seas. In two voyages he reached the Gipsy Compass on the island of Spitzbergen, in 1838, and Cape Chelyuskin, 77° 41' N., and after wintering near Behring Strait sailed into the Pacific and reached Yokohama, 21 September 1839. Thus, three and a quarter centuries after the attempt of Willoughby, the North-East passage was at last completed. Before that date an Austrian expedition under Lieutenant Payer and Wegrepp had been singularly successful, having discovered an island about 200 miles north of Nova Zembla, as large apparently as Spitzbergen. This new country, Franz-Josef Land, extends from 80° N. to about 83°. It was still farther explored to the north-west in 1880 by Mr. Leith Smith, who spent the winter 1881-82 there, and his companions escaping with great difficulty. The Jackson-Harmsworth expedition did valuable work there in 1894-95.

The more recent exploration to the north of America has added little to our geographical knowledge, however interesting in certain scientific aspects. The expedition of Kane and Hayes in 1833-55 reached in sledges Cape Constitution in 82° 27' N., and saw what appeared to be an open polar sea. Hayes again (1860-61) reached 81° 37' N. In 1877 the Polaris, under Captain C. F. Hall, 11° 30' from the U.S., and which reached the latitude 82° 16', which was surpassed in 1876 by the English expedition under Captain Nares; Captain A. H. Markham, by means of sledges, reaching 83° 20' N. At the same time Adrich explored the north shore of Grinnell Land. More famous and more disastrous was the 'Lady Franklin Bay Expedition,' 1881-84, conducted by Lieutenant Greely; the relief party sent in the summer of 1883, being unfortunately entrusted to military men, failed to reach the explorers, who, therefore, compelled to abandon their ships and find their way southwards through almost impassable ice. In October 1883 Greely and his brave companions landed at Cape Sabine, the bleakest spot probably in all the Arctic regions; and there in June 1884 Commander Selby found the six men who still survived. Greely and his associates are the subject of scientific interest the 'Lady Franklin Bay Expedition,' 1881-84, conducted by Lieutenant Greely; the relief party sent in the summer of 1883, being unfortunately entrusted to military men, failed to reach the explorers, who, therefore, compelled to abandon their ships and find their way southwards through almost impassable ice. In October 1883 Greely and his brave companions landed at Cape Sabine, the bleakest spot probably in all the Arctic regions; and there in June 1884 Commander Selby found the six men who still survived. Greely and his associates are the subject of scientific interest.

The Jeannette expedition under Commander De Long, sent out by the New York Herald in 1879 to the north by Behring Strait, ended in disaster. The vessel was crushed in the ice in June 1882 in 77° N., 153° E., and De Long and many of his men perished. The ice plateau which covers Greenland (q.v.) was in 1898 crossed from east to west by Nansen and Peary did good work there in 1898-99. In 1899-90 Nansen (q.v.) undertook a more adventurous journey, drifting in the frozen-in Fram as far north as 84° 4', and with one companion penetrating on foot to 88° 14'; all returned in safety. Andre started on his still more adventurous balloon journey to the Pacific and in 1896-97 the Duke of Abruzzi reached lat. 86° 19' 48".

At the suggestion of Lieutenant Weydrecht, an International series of polar observatories was established around the north pole area, for the purpose of continuous observation beginning with August 1882. The stations selected were the following: Rossiseknp, in Lapland (Norwegians); Ice Fjord, Spitzbergen (Swedes); Lena Mouth, Siberia, and Möller Bay, Nova Zembla (Russians); Dickson Harbour, mouth of the Yenisei (Danes); Drygalski (Dutch); Great Slave Lake (English); Point Barrow on north coast of America, east of Behring Strait, and Lady Franklin Bay, in Grinnell Land (the United States, the latter being Greely's expedition); Cumberland Bay, Davis Strait (Germans); Jan Mayen Island (Australians); Goldhaber, Greenland (Danes). The Germans had also a station on South Georgia Island, on the verge of the Antarctic, and the French on the south coast of Patagonia. The result was a series of observations of high value on the physics, meteorology, and natural history of the polar, especially the magnetic situation.

Thus, the expeditions are all still in progress, and the result of the last one which was continued for some years under Bunge and Toll, who not only explored the mainland, but made a thorough investigation of the New Siberian Islands.

It only now remains to survey shortly the polar explorations of the mighty Southern or Antarctic Ocean. Some of the earlier navigators of the 16th and 17th century were drifted south as far as South Georgia and South Shetland. Cook was the first to undertake a systematic exploration of the region, sailing all round at a high latitude, and so disproving the theory that there existed an entrance to the Antarctic to be found on old maps. Cook reached 71° 15' S., in 106° 50' W. In 1821 the Russian Bellinghausen discovered the islands named Alexander Land and Peter Land. Weddell afterwards sailed south to 74° 15', and in 1851 Biscoe discovered Enterprise Land, 65° 57' S., and Graham Land, 67° S. The French expedition, 1838, under D'Urville, found its advance to the pole blocked by a bank extending east and west for 300 miles; La Terre Adélie, in 140° E., was first named in this voyage. In 1840 the United States expedition under Captain Wilkes discovered a long coast-line, apparently extending from Enterprise Land eastwards to Ringgold's Knoll, but the only part of this which has since been found was discovered by Balleny in 1839. The most important results obtained in the Antarctic region are due to Sir James Clark Ross, who made three voyages, 1839-43, discovering Victoria Island, with a lofty range containing the volcanoes Erebus and Terror. He traced the coast from 71° S. to 78° 10', the highest latitude yet reached in the Antarctic, after passing some ice-floes which were 100 miles broad. These southern expeditions of a like nature which the Southern Continent, in which some of the greatest explorers, have supplied valuable information for students of magnetism, meteorology, geology, and natural history, besides extending the bounds of geographical science. The Challenger expedition only just crossed the Antarctic circle. The general result of all the exploring work is that in the north polar regions the unknown has been pushed back to within 80° N. lat.; while in the south, the Greenland and the Nova Zembla regions exploration has been carried to within about 400 miles from the North Pole. Once again, therefore, with the exception of patches here and there, the southern pole region is a great blank within the Antarctic Circle. The Australians have been making efforts within the past few years to take up Antarctic exploration afresh, but nothing has yet been done. The Royal Geographical Society in England has again raised the necessary funds for an Antarctic expedition, and Germany provided for one on an ample scale in 1890 under Von Drygalski.

The physical geography of the north and south polar regions is largely treated at ARCTIC OCEAN, ANTARCTIC OCEAN. See also GEOGRAPHY, POLAR.
Polarisation.

(1) Of Light.—An ordinary narrow beam of sunlight has no sides, and is always divided into two equal beams by a crystal of ice—lact also. A thin plate of doubly-refracting rock crystal, or of some other glass or water, will then be found in general that different results, as regards the intensities of these two beams, are produced by turning the crystal of Iceland spar round the axis of the beam into different successive positions. The beam is no longer the same all round, but has acquired sides. On the vibratory or undulatory theory of Light (q.v.) this shows that the vibrations must be transverse to the direction of propagation (see POLARITY).

Suppose a long cord, fixed to a distant wall, to be held in the hand; apply a sharp up-and-down motion, and the cord will remain always parallel to the cord to the wall; this illustrates the mode of vibration in a beam of plane polarised light. Make the hand move in a circle, in a direction contrary to that of the hands of a clock; a wave will run along the cord in a single plane all the way; and will advance after the fashion, of a coke-screw; this illustrates the mode of vibration in a right-handed circularly polarised beam of light. Make the hand move in a circle clockwise; the wave-screw advances in a left-handed circularly polarised light. Make the hand move in an ellipse; an elliptical disturbance travels, screw-fashion, right- or left-handed as the case may be; this represents elliptically polarised light.

Communicate a series of disturbances of the greatest irregularity, in which no one direction, up or down, right or left, has on the whole any predominance; the irregular succession of transverse disturbances which will travel along the cord will represent the vibration in a beam of common or natural light.

Assume that while communicating these irregular disturbances to the beam the hands are employed in making the cord travel with reference to any particular direction, say up and down; the vibrations in that direction are on the whole less than those from right to left; and the whole complex of irregular disturbances would, if the wave trains all tend to fill up an ellipse with their trace-marking rather than to fill up a circle, as the vibrations in common light would tend to do; this would represent the nature of the vibrations in partially polarised light. Now suppose a slot in a board, which will allow the cord to swing from end to end of the slot, but will not allow the cord to swing athwart the slot; all those oscillations or components of oscillation which are parallel to the slot will be able to traverse the slot; but those which are at right angles to these will not be allowed to pass. On endeavouring to transmit light, and upon the complex of oscillations which illustrate the vibrations of common or natural light, it will be found that no motion at right angles to the slot is transmitted, and that what does pass through is a complex of irregular oscillations transmitted by the first thin plate through the second slot, at right angles to the first, will cut off the whole of what passes through the first; and the propagation of transverse oscillations along a cord may thus be entirely checked. If, however, the second slot be parallel to the first, all the oscillations transmitted by the first may pass through the second also; and if it lie in an intermediate direction, the second slot will allow a proportion to pass, which depends upon the angle between the two slots, being proportional to \( \cos \theta \), where \( \theta \) is that angle. The first slot illustrates the functions of a polariser; the second illustrates those of a second polariser or analyser. A polariser reduces incident common light to a plane polarised condition, and an analyser at right angles to the polariser will quench it almost completely.

The phenomena of polarised light were first observed in sunlight reflected from water or glass. Common or natural light so reflected is always, except when it retraces its path by direct reflection, in fact, plane polarised. The polarisation is more or less complete according to the angle of incidence. At one particular angle of incidence the reflected light is as nearly plane polarised as the particular reflecting substance employed can make it. At this angle, the so-called angle of complete polarisation, the reflected and the refracted rays are (or tend to be) at right angles to one another, and \( \tan \theta = \mu \), where \( \theta \) is the angle between the incident ray and the normal, and \( \mu \) is the index of refraction (see REFRACTION).

Metal reflectors have no angle of complete, but they polarise the light, especially when the angle of incidence is such as to make the reflected light to be plane-polarised. Metal reflectors, which are not polished with a plane, are termed `unidirectional'; and such substances as glass, which are usually said to have an angle of complete polarisation by reflection, it is only those whose index of refraction is \( \approx 1.46 \) which can completely polarise common light. In the case of the reflected light from the glass of the reflected plane polarised beam is in that of the original incident beam of common light as 6:22 to 100, or 6:32 per cent. The intensity of light polarised by one reflection is therefore a good deal less than the 50 per cent, which might be secured by any contrivance which effectually acted in a way analogous to the first slot above mentioned. The intensity of light polarised by reflection is greatly improved by using, instead of a single reflecting plate, a pile of plates. A crystal of tourmaline or of isodi-sulphate of quinine will, on the whole, allow only light polarised in one particular plane to pass through; but then it darkens it and colours it. Advantage is accordingly taken of the property of a doubly-refracting transparent crystal, such as Iceland spar, of dividing an incident beam of common light into two beams which are, in any given part of the crystal, polarised in planes at right angles to one another, and each of which possesses (absorption apart) half the intensity of the original beam. See REFRACTION (Doubly).

As these two beams diverge from one another they form a plane carried in the plane of the paper, and it is easy to arrange that one of them shall remain parallel to the axis of the incident beam and of the apparatus, while the other is allowed to wander away laterally; and this is the basis of the construction of the prisms of Nicol, Pouchault, Wolfsen, Rochon, and others, which receive incident ordinary light and transmit plane polarised light.

Two beams of plane polarised light can interfere with one another (see INTERFERENCE) when their vibrations are wholly or partly in the same direction, but not if they are at right angles to one another; and a beam of light polarised in any way can give rise to the phenomena of Diffraction (q.v.).

On interposing in the path of a plane polarised beam of light an analyser, so placed as to allow none of that light to be transmitted, and then changing the analyser a thin film of a doubly-refracting substance, such as mica, the field of view may become filled with light. The doubly-refracting film generally breaks the incident plane polarised beam into two parallel, but not if they are at right angles to one another, and on the whole coincident if of sufficient breadth. These two beams are differentially retarded in the mica; and, according to the amount
of this relative retardation and to the position of the principal plane of the incorporated film, their resultant, that which reaches the analyser, may be a beam plane polarised in the original plane, plane polarised in another plane, elliptically polarised, or circularly polarised. In all these cases except the first, the analyser lets some light through. If we substitute in the analyser a doubly-refracting crystal, there will in general be two images seen on looking through; but as this crystal itself introduces relative retardations, the result of which depends on the wave-lengths—i.e. on the colours—the different wave-lengths may give different relative retardations, and the two images may appear in the eye as one. In this case the two images may thus be coloured; and when coloured they will be complementarily coloured. The phenomena of colour produced by the reflection of polarised light upon various doubly-refracting crystals and films, &c.,—all which colour-phenomena, are due to varying relative retardations of ordinary and extraordinary rays in doubly-refracting media, and are either uniform all over the resultant wave-front or vary with respect to particular parts of it—are of great value. These give the same beauty. For an account of these we refer to Thomas Preston’s Theory of Light (Lond. 1890).

A beam of plane polarised light may be recognised by means of a crystal of Iceland spar. Paste a piece of paper with a pin-hole in it on one end of the crystal; look through, turning the crystal round, each of the two images waxes and wanes and disappears alternately with the other. In partially polarised ordinary light, and in elliptically polarised light, the two images wax and wane alternately with one another, but do not disappear. In circularly polarised light the images remain equal to one another, and present no variation of intensity. Circularly or elliptically polarised light is converted by a plate of mica of proper thickness into plane polarised light; natural light, unpolarised or partially unpolarised, is not so affected by the same plate of mica. These criteria enable the character of a given beam of light to be readily recognised.

The name of Rotatory Polarisation is given to the phenomenon observed when a beam of plane polarised light is sent through a slice of quartz cut parallel to one axis. The plane of polarisation is found to have been rotated, and that into a different position for each component colour; so that, with white light incident, a crystal of Iceland spar gives two images complementarily coloured, and varying in colour on rotation of the prism. This property of rotation is shared by many substances even in solution: cane-sugar, grape-sugar, camphor not like quartz, rotating the plane of polarisation to the right (dextro-rotatory); fruit-sugar and starch rotate the plane to the left (levo-rotatory). Upon this property are based various instruments for the determination of sugar in the solution called saccharimeters. If the light whose plane has been rotated be reflected back through the plane-rotating medium, the rotation is reversed, and the light emerges polarised in the original plane. A somewhat similar phenomenon, though much less pronounced, is observed on passing a beam of light through heavy glass in a strong magnetic field; but here, if the path of the light be reversed by reflection, the rotation of the plane is not reversed but doubled.

As to the direction of vibration in a plane polarised light, it is to be noted that in the production of a plane polarised light by reflection it is necessary to consider whether the vibration is to be polarised in the plane of incidence—i.e. in a plane containing both incident and reflected rays: the question is whether the vibration is in this plane or at right angles to it. Fresnel worked out the consequences of the vibration being at right angles to this plane, and arrived at (on the assumption that the density of the ether in two medium, at whose bounding surface reflection takes place, is different in the two media, while its elasticity is the same in both) at consequences consistent with experiment. Neumann and MacCullagh, from the contrary hypothesis of the uniform density of the ether, and on the hypothesis that the vibrations are parallel to the plane of polarisation, arrived at optical conclusions which, so far as it is possible to test them by experiment, are equally consistent with observation. Clerk-Maxwell's demonstration of the phenomena of light, confirmed by Hertz’s researches (see Magnetism), requires that there should be an undulatory propagation of electric disturbances at right angles to the plane of polarisation, and of magnetic disturbances parallel to that plane.

Polarisation of light is useful in several ways. A polariser can be made to cut off the glare from the surface of water while we look into its depths; or to cut off a large portion of the light which is reflected from haze and obscures our view of landscape; or it may be used in examining the light of the sky, for it is possible to account for the phenomenon of skylight by the rotation of light in reflection (see Sky). A polariser and analyser are of use in examining the strained condition of glass which, when heated or bent, &c., or too suddenly cooled, will give rise between crossed prisms to phenomena analogous to those produced by a doubly-refracting crystal; and they are also of use in low-power microscopic work for the examination or identification of crystals and of many organic structures. Crossed prisms have also been used to reduce the intensity of a beam of light to any required percentage for photometric purposes.

(2) Polarisation of the dielectric or medium between two opposite charges of electricity; a condition of stress.

(3) Polarisation of a Galvanic Cell.—Production of a reverse ‘electromotive force’ by the deposition of elements of the electrolyte upon, or their combination with, the plates of the cell.

(4) Polarisation of Electrodes.—An entirely similar phenomenon in an electrolytic cell. When the battery is taken off, a reverse current flows from the electrolytic cell; this is the basis of the gas battery and of the modern accumulator (see Electrolysis).

Polarity, in physical science, a word of various application; but in all its uses there is present the idea of a directed quantity or Vector (q.v.). A sphere, situated in space, is a perfect type of all-sidedness, presenting the same aspect in every direction. Let this sphere, however, begin to rotate about some diameter, and at once it becomes a polar body; it becomes possessed of polarity (see Polars). Looked at from one end, it appears rotating clockwise; looked at from the other, it appears rotating counter-clockwise. A similar polarity is acquired by a body of any shape when it is set spinning about some polar axis. Hence we may take rotation as a very perfect illustration of kinematic polarity.

Perhaps the most familiar example in physics of a polar body is the magnet. Its polarity is a force-polarity, the ends or poles of one magnet having a certain magnetic power upon the ends of another. This particular action is, however, only one of a host of manifestations of what is known as Magnetism (q.v.); and the general tendency in modern theory is to explain all magnetic phenomena as being essentially rotations of a physical, dynamical point of view, the conception of rotation as a true type of polarity. The phenomena of statical electricity have also been discussed as analogous to certain phenomena in vortex motion.
In electrolytic polarisation, however, it is difficult to see any rotational analogy. Here the electrodes which bring and carry away again the electric current flowing through the decomposing liquid acquire new properties and functions which have distinct directive relations to the current itself and prevent them. See Electricity, Induction, Magnetism.

In all the cases so far mentioned the polarity or polarisation involved is of such a nature as that originally typified by the sphere's rotation; there are two entities in which some respects have opposite characteristics. In polarisation of Light (q.v.), however, this condition is no longer always fulfilled. For instance, a plane polarised ray of light which is stopped by a Nicol prism passes more or less completely as soon as the prism is rotated around an axis colatitude with the ray. The ray has, in fact, peculiarities as regards its sides—its 'polarity', is strictly speaking, lateral, not polar. On the other hand, in a circularly polarised ray we have, according to the ordinary theory, a true kinematic polarity of a rotational kind, so that, looking along the ray we are able to distinguish right-handed and left-handed circular polarisations. It may be mentioned as a final illustration that the rotation of the plane of polarisation by means of quartz or a saccharine solution is not a real polar phenomenon, the rotation being for any one substance in the plane normal to the travelling ray; but that the rotation of the plane of polarisation in a magnetic field is a true polar phenomenon, changing sign with the direction of the field.

**Polar Lights.** See Aurora Borialis.

**Polder,** in the Netherlands, is land below the level of the sea or nearest river, which, originally a morass or lake, has been drained and brought under cultivation by throwing sand or gravel into the water. A polder, formed of a canal of sufficient height to command a run towards the sea or river, is made, and when carried quite round, as in the case of the Haarlem Lake, it is called the Ringovart. At one or more points on the embankment apparatus for lifting water is placed, and worked by wind or steam power. If the lake deepens towards the centre, several embankments and canals are necessary, the one within the other, formed at different levels as the water-surface becomes lessened, a connection being maintained with the outer canal, which secures a run for the water. In the Netherlands in North Holland are four canal systems, the land between forming long parallelograms. The water from the inner space is lifted into the first canal; that again, with the drainage of the second section, is thrown into the second, and so on until the outer canal is reached and the water obtained. The polders in the Netherlands are very numerous, the most important being the Haarlem Lake (q.v.), possibly to be surpassed by that of the Zuider Zee (q.v.). See also Holland, Vol. V. p. 739.

**Pole.** See Rod.

**Pole, De la,** a family descended from William de la Pole, a Hull merchant, whose son Michael in 1383 became chancellor under Richard II., in 1385 was made Earl of Suffolk, and in 1389 died an exile in France. His grandson William (1396-1450) was the year before his death raised from Earl to be Duke of Suffolk, having since 1445 been practically prime-minister to King Henry VI. He was a disaster to the nation; and he was on his way to a five years' banishment in Flanders, when he was captured by a ship sent after him, and beheaded. John de la Pole, Duke of Suffolk (died 1491), married Elizabeth, sister to Edward IV. and Richard III., and from his son John, Earl of Lincoln (died 1487), Edmund, Earl of Suffolk (executed by Henry VIII., 1513), two churchmen, four daughters, and Richard, on whose death at the battle of Pavia in 1525 the line became extinct.

**Pole, Reginald, 'Cardinal of England,' was the son of Sir Richard Pole, and Margaret, Countess of Salisbury, the daughter of the Duke of Clarence and niece of Edward IV. He was born in Staffordshire, March 1503. He received the rudiments of his education from the Carthusians at West Sheen, and at the age of twelve went to Pagans, Oxford University, and was afterwards proceeded to Padua. He returned to England in 1523. He was then high in Henry's favour, while Queen Catharine was much attached to his mother. Pole's position, when the question of the king's divorce was raised, became a difficult one. He appeared at first disposed to take the king's side. In 1530 we find him in Paris endeavouring to obtain from the university a decision favourable to the divorce, but shortly afterwards he became a convert of Cranmer, refused the archbishopric of York which was offered to him on the death of Wolsey, and renounced the king upon the course he was pursuing. Henry, however, made no open quarrel with him; and Pole left England in 1532, and after a short stay at Avignon travelled to France, and there bore his name and his weight with both men of learning and piety—Sadolet, Contarini, Morone, Flamino, Priuli, and others—who were urgent for an internal reformation of the church, and whose views on justification by faith and grace were approximating closely to the doctrine of Luther. Pole still retained his English ecclesiastical revenues, and made no hostile demonstrations against Henry, but in 1533 he entered into a political correspondence with the Emperor Charles V. Pole was now completely by Henry to declare himself, which he did in a violent letter addressed to the king, afterwards famous in its revised form as the treatise De Unitate Ecclesiastica. The king withdrew Pole's pension and prebends. Paul III., on the other hand, made him a cardinal (22d December 1538), and sent him to the Low Countries to confer there with agents of the English malcontents. Henry retaliated by causing a bill of attainder to be passed against him, and by setting a price on his head. His mother, with other relatives, was thrown into the Tower. He was received in Brussels by the Emperor, and was made a cardinal, and subsequently beheaded. Pole's diplomatic career was not, however, a brilliant one. His several attempts to procure the invasion of England were not successful. From 1539 to 1542 he acted as governor of the 'Patrimony of St Peter,' of which Viterbo was the capital. He took an active part in the discussions on the Interim, and when the Council of Trent was opened in 1545, he was one of the three cardinals who acted as legate-presidents. In the conciliar session of 1541, in 1549, Pole was at one moment on the point of being elected pope; after the election of Del Monte, as Julius III., he lived in retirement at a Benedictine monastery at Maguzzano on the lake of Garda, until the death of Edward V. He then proceeded to England as legato a latere, to assist Queen Mary in the reconciliation of the kingdom to the Church of Rome.

Pole was still only in deacon's orders, and had not abandoned the idea which he had apparently entertained, of an active part in the southern Marches of Tudor. The queen for a moment considered the project of obtaining a dispensation for this union with favour, but the influence of Charles V. pre-
POLENTA

vailed in favour of his son Philip. The emperor's fear of Pole's interference or precipitancy led to the legate being prohibited from continuing English for Pole. Philip was married July 25, 1554. Pole's attainder was removed by parliament, November 22, and two days later he arrived in London. He was provided with ample powers to allow the owners of the confiscated church property to retain their possessions, a condition which was understood to be absolutely necessary to secure the submission of parliament. On the 30th Pole solemnly dissolved the Houses of Parliament and country from their schism, and reconciled the Church of England to Rome. As long as Cranmer lived Pole would not accept a provincial archbishopric at Canterbury, although the see was vacant by the former's degradation, but after Cranmer was burnt Pole was ordained priest, 26th March 1556, and on the 22nd consecrated archbishop. In the meantime Giovanni Pietro Caraffa, once a friend of Pole and afterwards his bitter enemy, had become (May 1555) Pope Paul IV. The pope was indignant at the concessions made by the authority of his predecessor to the holders of church property, and he revived the accusations of heresy which had been in former days brought against Pole, both on the ground of his heresy and on his sympathies with the papal governor at Viterbo, and of his well-known opinions on justification. Paul IV. was, moreover, now at war with Spain, and could not tolerate Pole as his ambassador at the court of Philip and Mary in England. The cardinal's legation was accordingly cancelled, and he was summoned before the Inquisition, into the prisons of which the pope had already thrown Pole's friend the Cardinal Morone. Mary angrily protested, and the pope somewhat relented. He would not reinstate Pole, but appointed William Peto, a Franciscan friar, as cardinal legate in his place. The queen gave orders that the papal messenger bearing the hat should be stopped at Calais, and Peto died without receiving it. When peace was made between the pope and Spain, Paul still refused to reinstate Pole as his legate, and he did not withdraw the odious and unjust accusations of heresy. When the queen died, 17th November 1558, Pole, whose health had been long feeble, was lying dangerously ill. The impending failure of all his hopes no doubt hastened his end. He died on the following day, sixteen hours after the queen, in his fifty-eighth year.

It has been a disputed question how far Pole was responsible for Mary's persecution of Protestants. His leniency towards heretics in Italy had even brought him into trouble. Nevertheless it is remarkable that after Philip's departure from England and Gardiner's death (November 1555), when Pole became the queen's supreme adviser and her inseparable companion, the persecution increased in violence. If it was not instigated by Pole, it could not have continued without his sanction and support. In his diocese of Canterbury he issued in the first year of the reign an edict against heretics, and in July he delivered over to the secular arm five persons, who were burnt alive at Canterbury a week before his death.

Besides the above-mentioned De Unitate, Pole was the author of De Concilio (Rome, 1502), De summis Pontificum officiis (Rome, 1503), and De Austriaco Leone (Louvain, 1569). His letters, with a life prefixed, were published by Quirini (Brescia, 1744). Beccatelli's life of Pole, originally written in Italian, was published in a Latin translation by C. F. B. I. in 1690, and an English translation by B. Pye in 1706. The first edition of Phillippus' life, which occasioned much controversy, appeared in 1764-67. The fullest recent life of Pole is that by Hook, vol. i. and 2d. (London, 1798). See English Church History, Commentaries, Banke's Lives of the Popes, Froude's History, and Dixon's History of the Church of England, vol. iv.

**POLENTA**

Pole-axe (originally pollax, from poll, 'the head,' and axe; see BATTLE AXE.

Polecat, or Fitchet (Mustela putorius, or Fitchet) is a quadruped of the Weasel family (Mustelidae), and commonly referred to the same genus with the weasel, stoat or ermine, &c. It is the largest of the six British species of that genus, the length of the head and body being about 17 inches, the length of the tail more than 6 inches, the form stouter than that of the weasel or of the ermine. Its colour is a deep blackish brown; the head, tail, and feet almost black, the under parts yellowish, the ears edged with white, and a whitish space round the muzzle. The hair is of two kinds—a short woolly fur, which is pale yellow, or somewhat tawny, and long shining hairs of a rich black or brownish-black colour, which are most numerous on the darkest parts. The nose is sharp, the ears short and round, the tail pretty equally covered with longish hair. There is a pouch or follicle under the tail, which exudes a yellowish, creamy substance of a very fetid odour; and this odour is particularly strong when the animal is irritated or alarmed. Hence, apparently, its name *Foumart* ('Foul Marten'), which, with various provincial modifications, as *Fumart*, *Thoumart*, &c., is prevalent in most parts of Britain. The origin of the names Polecat and Fitchet is much more uncertain.

The polecat was much more common in Britain in former times than now, and is almost extirpated from some districts, through the constant war waged against it by game-keepers and others; and it is said that it is a veritable rat, bearing five, six, or even seven young at one birth. It is extremely destructive in the poultry-yard, the abundance present there inviting it to drink blood and eat brains, which seem to be its favourite luxuries. The rabbit is followed by the polecat into its burrow, and its ravages among poultry are partly compensated by its destruction of rats. The taming of the polecat does not seem to have been attempted. The smell prevents it. The skin is imported from the north of Europe under the name of *fitch*, and is used as a kind of fur, similar but inferior to that of the *Marten* (q. v., and see *Furs*). To artists the hair of the *fitch* or *fitchet* is well known as that of which their best brushes are made; the hairs used for this purpose being the long hairs already noticed, which grow through the lighter-coloured fur of the animal. The Ferret (q. v.) is supposed by some to be a mere variety of the polecat. A dark-coloured kind of ferret is commonly regarded as a cross between the polecat and the ferret, and is sometimes called the polecat-ferret.

**Polemoniaceae**, a natural order of plants, mostly herbaceous, allied to Convolvulaceae, and containing more than 100 known species, natives of temperate countries, and particularly abundant in the north-western parts of America. *Polemonium caruleum* is Jacob's Ladder (q. v.); *Phlox* is also of the order.

**Polenta**, an Italian dish, the chief ingredients of which are maize meal and salt. Sometimes wheat
or chestnut meal is used. It is made into a thick paste, cut into finger-like strips, and baked, generally with an addition of cheese. It is eaten either by itself or with roast liver or steamed meat and sauce. A similar dish, called Mamaliga, is eaten in Transylvania and Lower Hungary.

Poles (Gr. poleis, a ‘turning-point’), in Geography, are the two extremities of the axis round which the earth revolves; they are therefore situated the one on the north, and the other on the south side of the equator, and equidistant from all parts of it, or in 90° N. lat. and 90° S. lat. They are called the north and south poles of the Earth (q.v.).—In Astronomy the poles, which, for distinction, are frequently denominated ‘celestial poles,’ are those points in the heavens to which the earth’s axis is directed, and round which the heavens seem to revolve. The celestial poles are valuable points of reference to astronomers and geographers, so that the determination of their position in the heavens is of the utmost importance. Unfortunately, no stars mark their exact situation (see POLE-STAR)—though there is a minute telescopic star only a few seconds from the north pole, which may be employed instead of it in rough observations—and therefore it is necessary to seek some means for discovering its precise position. This is effected in the following manner: A bright star (generally the pole-star) is selected, and its position in its upper and its lower Cutsunations (q.v.) is accurately noted; the point midway between these two positions of the star is the pole of the heavens. The observation of the star’s two positions must be corrected for refraction, and it is for this reason that the pole-star is selected, since the effect of refraction is much the same in both positions of the star. The term ‘poles’ has, however, a wider application, also including the extremities of a line passing through the centre of a great circle perpendicular to its plane; thus, we have the poles of the horizon (viz. the zenith and nadir), the poles of the ecliptic, the poles of a meridian; and, in the same sense, the terrestrial and celestial poles of the heaven, as the poles of the equator and equinoctial respectively. Pole, in Physics, denotes those points of a body at which its attractive or repulsive energy is concentrated; see POLARITY, and MAGNETISM.

Pole-star, or Polaris, the nearest conspicuous star to the north pole of the celestial equator. The star which at the present time goes under the name of the pole-star is generally the main star of the constellation of Ursa Major. By examining attentively the general movement of the stars throughout a clear winter’s night, we obverse that they describe circles which are largest at the equator, and become smaller and smaller as we approach a certain point (the north pole of the celestial equator), close to which is the star above mentioned. This ‘pole-star’ is, however, a little less than 1° from the pole, and has a small but sensible motion round it. Owing to the motion of the pole of the celestial equator round that of the ecliptic (see PRECESSION), this star will in course of time (about 2100 A.D.) approach to within 28′ from the north pole, and will then recede from it. At the time of Hipparchus (150 B.C.) it was 12°, and in 1785 2′ 2″ from the north pole. Its place can easily be found in the heavens, for a line drawn through the stars Arcturus and Polaris (two pointers, from this peculiarity of the constellation Ursa Major, or the Great Bear, and produced northwards for about 4½ times its own length, will almost touch the pole-star. Two thousand years ago, in the place of the pole-star, there were two stars, and about 2300 years before the Christian era the star a in the constellation of the Dragon was not more than 10′ from the north pole; while 12,000 years after the present time the bright star Vega in Lyra will be within 5′ of it. See star-map at Ursa Major.

The south pole of the celestial equator is not similarly marked by the near neighbourhood of a bright star, the only star deserving the name of the south pole-star being of the sixth or least visible magnitude.

Pollautes. See TIBERGISE.

Police (Gr. politeia) is in modern times held to be synonymous with the whole body of men employed as constables, or with the system of administration under which such constables perform their duties in connection with the maintenance of law and order and the prevention and detection of crime. Originally, however, the politeia of the Greeks had a much wider signification, and what we now term force formed but a part of the regulation of the affairs of a state or country, which was the meaning of the original word. The Greeks, by the adoption of this term, says an old writer on police administration, apparently intended to indicate that the execution of those functions which were essential for the maintenance of that civil society which is the essence of every city, were two things inseparable from each other. The strictly executive character of police duties, however, as performed in Great Britain of the 19th century, was not always recognised in ancient times, as is governed by the English law, the district magistrate, who is ex officio head of the police within the limits of his jurisdiction, is also a judicial officer with extensive powers. In the capital of England itself, where the distinction between executive and magisterial functions is specially marked, the chief among these officials who were entrusted with police administration. It is difficult to refer to any country in which the separation of executive from judicial or magisterial functions has so strictly been carried out as would appear to be required under our modern interpretation of police duties. The French system of police, which is based on the old Roman administration, unites to a very considerable extent executive with judicial functions. The same remark applies to continental police administration generally; and even in the great dependency of India, a domain, by English law, the district magistrate, who is ex officio head of the police within the limits of his jurisdiction, is also a judicial officer with extensive powers. In the capital of England itself, where the distinction between executive and magisterial functions is specially marked, the chief among these officials is still, by virtue of his office, a justice of the peace, although the exercise of his powers in that capacity is restricted by certain conditions.

The existing system of police administration in the United Kingdom is of very recent origin; it arose within the 19th century, and in many instances was developed within the reign of Queen Victoria. In the early period of English history there was no such institution as a separate body of police. The responsibility for maintenance of the peace was imposed on each hundred or tithing, and the members of these divisions were held jointly liable for the consequences of any infraction of the laws which took place within their limits. Self-interest made every member of the association a constant, and although the collective responsibility of the tithing or hundred was for executive purposes represented by the headman of each, such transfer of liability was not recognised by the law when any penalty for breach of the peace was incurred. As time went on the business of the headman of the local division was taken by a constable or constables in the various villages or parishes of the country. In the larger towns the members of the various wards at first
maintained order and kept watch within their various limits; gradually separate watchmen, very inadequately paid, were introduced; but the inefficiency with which watch and ward duties were performed, and the impunity with which crimes were committed, were conspicuous, and in no place more than in the metropolis itself. During the 18th century spasmodic attempts were made to improve the administration in London, both as regards prevention and detection of crime. Horse patrols were introduced; a detective staff was organised; but the whole system was fragmentary and disjointed and the courts under which it was administered were manifestly unsatisfactory. The deprecatory of the old 'Charlies,' as the watchmen were called, and their inability to afford protection to the inhabitants of London, were proverbial; and as to Edinburgh we may read in the pages of the *Heart of Midlothian* Sir Walter Scott's description of 'that black banditti,' the 'City Guard,' who were in his days the 'alternate terror and derision of the petulant brood of the High School,' and objects of scorn to the citizens generally. At last in 1829 Sir Robert Peel constituted the Metropolitan Police, and the whole police system of the metropolis outside of the narrow limits of the City of London itself, and placing the control of the new force in the hands of the Secretary of State, Counties and boroughs followed suit in remodelling their police on the administrative principles adopted—save with reference to local control—by Sir Robert Peel in 1829, and since then the present system of police administration throughout the country has been developed on the lines of the original statute, 10 Geo. IV., chap. 44, amplified by 2 and 3 Vict. chap. 47. The new guardians of the peace in the metropolis, the constables, were of course, police-constables, and were in a sense a development of the tithing-man of old; but they resembled him even less than a member for a metropolitan borough resembles the burgesses who appeared before the chief-justices at Westminster with a statement of accounts in the reign of John. Yet the stages of growth are sufficiently well marked—from the responsibility of the tithing to the responsibility of its head, from the functions of the head board or tithing-man to the functions of the constable, from the election of a plurality of constables, to the election of a plurality of constables, and finally from a plurality of constables, deputy constables, and watchmen, under parochial or other local authority, to a plurality of constables under the central authority of a Secretary of State ("Pike's History of Crime in England, ii. 460").

In 1897 the police force in England and Wales had a total strength of 42,140 officers and men; in Scotland, 4,707; Ireland, 12,900. In 1891 the numbers were 37,657, 4194, and 13,977 in the three countries respectively; the total cost being about £2,500,000 a year. The proportion of police engaged in the maintenance of the peace, with reference to population and (b) to £10,000 of rateable value in the following cities and large towns, is as follows:

<table>
<thead>
<tr>
<th>Place</th>
<th>Pop.</th>
<th>Daily Number</th>
<th>Proportion Number per £1,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>11,500,000</td>
<td>12,370</td>
<td>1.035</td>
</tr>
<tr>
<td>London</td>
<td>6,000,000</td>
<td>6,010</td>
<td>1.000</td>
</tr>
<tr>
<td>Liverpool</td>
<td>1,000,000</td>
<td>1,000</td>
<td>1.000</td>
</tr>
<tr>
<td>Birmingham</td>
<td>850,000</td>
<td>850</td>
<td>1.000</td>
</tr>
<tr>
<td>Manchester</td>
<td>750,000</td>
<td>750</td>
<td>1.000</td>
</tr>
<tr>
<td>Leeds</td>
<td>500,000</td>
<td>500</td>
<td>1.000</td>
</tr>
<tr>
<td>Sheffield</td>
<td>325,000</td>
<td>325</td>
<td>1.000</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>350,000</td>
<td>350</td>
<td>1.000</td>
</tr>
<tr>
<td>Leicester</td>
<td>250,000</td>
<td>250</td>
<td>1.000</td>
</tr>
<tr>
<td>Dundee</td>
<td>150,000</td>
<td>150</td>
<td>1.000</td>
</tr>
<tr>
<td>Dublin</td>
<td>300,000</td>
<td>300</td>
<td>1.000</td>
</tr>
</tbody>
</table>

The above figures show that in determining the number of the police the authorities of each city and town have taken into consideration the varying needs and circumstances of each place, rather than to have aimed at subordinating their requirements to a theoretical proportion of police to population.

The police force throughout the country is in all respects a civil body. In the metropolis and in the larger towns it is of course necessary that the constables should be more or less drilled, to enable them when called on to act together in bodies, but the force is in its essence, constitution, and performance of duty, civil and non-military. In English police in London, they are called out by magistrates to supplement the police in the maintenance of law and order, but, thanks to the law-abiding character of the people, such occasions are of rare occurrence. The only branch of the force of which the constitution is more military than civil is the Royal Irish Constabulary, which will be noticed further on.

The control of the various police forces throughout the country rests with local authorities; the only exception to the rule being the Metropolitan Police, who remain, as they were originally designed to be, under the control of the Secretary of State. In England and in the larger counties and boroughs, police are provided by the counties and the boroughs, but in the smaller counties and boroughs the chief-justice of the peace is in charge. In Ireland the practice is the same, except that the chief justice of the peace is the agent of the Government through the Her Majesty's Secretary of State for the Home Department. On the continent of Europe the police forces still remain under the direct control of the state, and to a greater or less extent are frequently used for political purposes, as well as in the conservation of the public peace. In the United States (see below) the principle of local control is general, but in many of the larger cities police appointments are not altogether unconnected with services rendered to local politicians.

**Metropolitan Police.**—The total strength of the Metropolitan Police (exclusive of the City of London, which has a separate police force), as established by 2 and 3 Vict. chap. 47, extends over a radius of 15 miles from Charing Cross, and embraces a radius of about 700 sq. m. The population of the district may be estimated at not less than 53 millions; its acreage is about 441,000 acres; and the length of beats covered in the various streets, squares, and roads amounts to 8200 miles. Under 23 and 24 Vict. chap. 125, the Mayor of the metropolis is nominated by the Secretary of State, and employed in Her Majesty's dockyards and in the principal stations of the War Department. The cost of police per inhabitant is about 4s. 8d. Since 1868 the cost of the force has been limited to the proceeds of a 9d. rate on the rental assessed in the Metropolitan Police district, of which 4d., till 1889 contributed by the Treasury, is now paid by the county councils, out of the Exchequer Contribution Account, and 5d. by the parishes. In 1890 an annual sum of £160,000 was allotted out of the proceeds of the Local Taxation Act, to defray part of the expenses of the police force. The amount available for police purposes in the metropolis may be put down as the total proceeds of the 9d. rate under the original statute, plus £160,000.

That the police of the metropolis is a costly body is apparent. Not only is the population which the force is called on to protect enormous, but it is also exceptionally congested in many localities. The locomotion of such enormous masses of people develops difficulties in dealing with traffic unknown elsewhere. The annual charge for buildings, rent, and taxes is, and must be, higher than in other places, and the loss of small quantities of property by the police force is not merely with an exceptionally numerous and skilful class of criminals, but to secure the safety of the largest body of citizens in the world while engaged in their lawful occupations, creates sources of expense.
peculiar to London; indeed, so many circumstances, non-existent elsewhere, combine to render the administration of this force expensive that in no other community the headquarters’ office, which, not compared with that of even the largest cities and towns of the kingdom.

The system of administration is a development of the principle on which the force was first established by Sir Robert Peel—"unity of design and responsibility of its agents." The head-quarters, or the commissioner, who, acting under the immediate authority of the Secretary of State, is responsible for the administration of the system throughout the Metropolitan Police District. The commissioner is vested with the power of a justice of the peace for Middlesex and the City of London, but is debarred from acting in this capacity at general or quarter sessions, or in any manner out of sessions except for the preservation of the peace, or for the prevention of crimes generally. Under the commissioner are three assistant-commissioners, vested with powers of justices, two of whom deal with details of discipline and ordinary business, the third being specially entrusted with the control of the criminal department.

The whole of the Metropolitan Police District is marked off into two divisions, each having a force of several hundred men under the charge of a superintendent, aided by a chief-inspector, inspectors, and sergeants. The superintendent is responsible for all the details of police administration within his division. For executive purposes the divisions are subdivided into chief-constable districts, each district comprising several divisions, and being in charge of a superior officer termed chief-constable.

Attached to each of the exterior divisions is a force of mounted men, aggregating in all about 250. The services of these men are employed on occasions of processions, public meetings, and similar demonstrations, the mounted force are brought in and perform valuable service. The Thames or River Police are recruited from sailors, and patrol the river in boats and steam-launches. Each principal station is in direct communication by telegraph with the headquarters, which, since November 1890, has been situated on the Thames Embankment, and is known as New Scotland Yard; and between every divisional station and its subdivisions the same system of telegraphic communication is maintained. For the detection of crime a special staff of officers is located in each division. Local crime is dealt with by these officers; for the conduct of special cases a separate detective staff is maintained at headquarters, under the control of the superintendent of the Criminal Investigation Department, and the whole detective organisation is specially under the charge of the chief-constable of the Criminal Department and of one of the assistant-commissioners. The supervision of habitual criminals is specially looked after at headquarters by the Convict Superintendents. The strength of the detective department is above 300 men.

County and Borough Police.—The total number of county and borough police in Great Britain is:

<table>
<thead>
<tr>
<th>Counties</th>
<th>Boroughs</th>
</tr>
</thead>
<tbody>
<tr>
<td>England and Wales</td>
<td>12,182</td>
</tr>
<tr>
<td>Scotland</td>
<td>1,597</td>
</tr>
</tbody>
</table>

All such police are under the control of local authorities. By the Local Government Acts of 1888 great changes were made as to the bodies entrusted with such control, and the county councils superseded in many instances the previous agencies for regulating police administration. With reference to counties, the control of the police is vested in a standing committee, consisting of an equal number of county councillors appointed by the quarter sessions and by the county council. In the case of cities and larger boroughs, which are termed county boroughs, the local councils retain the power which they formerly had, and smaller boroughs are treated as parts of the counties in which they are situated. The control of the police is vested by the quarter sessions of the county over the ‘City Police’ was in no way affected by the Local Government Acts of 1888. The cost of police, as before, is paid from rates levied in counties and boroughs, supplemented by a contribution from the ‘Exchequer Contribution Account’ of half the cost of pay and clothing of every force certified to be in an efficient condition. Such contribution was formerly made directly by the Treasury in aid of the local rate under the County and Borough Police Acts. Under the Local Government Acts of 1888, however, each sum, consisting of duties on local taxation, licences, and the probate duty, is now placed to the credit of the police account of the county fund in counties, and by the county councils disbursed to county police. In boroughs having a separate police force the amounts are paid to and expended by the local councils.

The chief executive officers of county and borough police forces, who are appointed by local authorities, are styled chief-constables; superintendents or chief-constables; and for inspection purposes, by the Act of 1882, are connected with the chief-constable of the county. In Scotland, two officers for the whole of England and Wales, and one for Scotland, are appointed by the Secretary of State. The system of administration in cities and large towns is based, as far as circumstances admit, on that which prevails in the Metropolitan Police District. In county districts concentration of the police is not required the duties are arranged to suit the requirements of each locality. Some of the more important railway companies employ a special staff of railway police.

Police in Ireland.—There are only two police forces in Ireland: the Dublin Metropolitan Police, which has jurisdiction within the limits of the capital, and the Royal Irish Constabulary, which, as an imperial force, performs police duty for the whole of the rest of Ireland. The Metropolitan Police of Dublin numbers 1214 men, under the command of a commissioner, and its administration is on the lines of the Metropolitan Police. The Royal Irish Constabulary is the only force in the kingdom which is practically on a military footing, and the members of which are armed, drilled, and disciplined as soldiers. Ordinary civil police duties, both in towns and counties, are performed by this force, but it is unfortunately too often that they are called upon to act as soldiers in cases of great disturbance. The chief-constable of the Royal Irish Constabulary is directly under the Irish government. It consists of 12,763 members, officers and men, and is commanded by an inspector-general. Under this officer is a deputy inspector-general, who again is aided by three assistant inspectors-general at headquarters. Each county is served by a chief-inspector of police, and counties again are subdivided into districts, over each of which a district inspector is placed. Below these officers come head-constables, sergeants, and constables, all trained to the use of arms, and disciplined as soldiers.

Police courts.—These may be termed courts of first instance for hearing criminal cases. In counties such courts are held by justices of the peace, sitting at either petty or special sessions; in boroughs by stipendiary magistrates, or by mem-
members of the local councils in their magisterial capacity. For the city of London there is one police-court held at the Mansion House, and presided over by the Lord Mayor or one of the aldermen. In the Metropolitan Police Bureau there are five police-court justices, each of whom is the chief of which is held at Bow Street by the chief-magistrate, assisted by two magistrates. To each of the other Metropolitan police-courts two stipendiary magistrates are attached. In Scotland sheriff-courts, both in towns and counties, dispose of a large number of minor cases committed to them. The number of criminal offenders convicted in 1890-98 was between 8000 and 8000 a year in England and Wales, between 1900 and 1700 a year in Scotland, and between 1500 and 1000 in Ireland.

**France.**—France is divided into two great branches—(1) The Police Judiciaire, whose business is to discover offenders, gather evidence against them, and hand them over to the proper tribunal (see FRANCE, Vol. IV. p. 776); (2) the Police Administrative, whose functions correspond more closely to those of the English police in maintaining order. They, however, (as police générale and police municipale), wider powers and more varied duties, having to superintend public meetings, inspect public food-supplies, administer the laws as to the publication of printed matter, the watching of watchmen, the prevention of thefts, examinations of morbid states, and to note the sale of arms. There is a special department of police politique. The armed police, with military organisation, on foot or mounted, known as gendamerie (21,000 men), together with gardes forestiers (8000) and gendarmes champêtres (21,000), are commissioners of justice (20,000), and the agents de police (14,000), belong to the judicial police. The nearest equivalents to English constables are the gardiens de la paix, formerly called sergents de ville, of whom Paris has some 6000. The Service de Sûreté is the detective department.

**United States.**—In the United States, where each state and each city has its own separate administration, the police system closely resembles that of England. The organisation of a uniformed municipal police is comparatively recent, even in the largest cities. New York, not substituted for the inefficient night-watch until 1845. The police organisation of that city may be taken as representative of the American system generally. The department of police of the city of New York consists of a board of police, comprising commissioners appointed by the mayor, and the 'police force' and officers appointed by the board. The city (with an area of about 82 square miles before the year 1897, and 359 square miles since) is divided into inspection districts, which are subdivided into precincts. At the head of the force is a superintendent, under whom there are inspectors, a captain over each precinct, sergeants, roundsmen (visiting officers), patrolmen (the body of the force), and doormen at the stations. There are also about a score of police surgeons. The general administration of the force is vested in the board of police who make appointments, transfers, &c., hear charges against members of the force, and make rules and regulations for the discipline of the department. The orders, however, must not conflict with the constitution of the Union or of the state. The superintendent is the chief executive officer, who is appointed by the board, to whom he makes written quarterly reports; and he receives similar quarterly reports in writing from each of the inspectors. The captains report every morning to the central office. The roundsmen must see that the patrolmen are properly performing their duty, and the sergeants again are responsible for both roundsmen and patrolmen. Besides the general force, there are several 'squads' organised for special duties. These include the 'sanitary police company,' whose members inspect buildings, premises, employments, ventilation, sewerage, &c., which are dangerous to health, or conducive to the spread of disease. They also visit lunatic asylums, report nuisances, and seize food unfit for consumption; officers of this company also act as school-board officers, and others, qualified as engineers, inspect steam-boats and stationary steam-boilers used for motive power in the city. The city also has several 'squad' officers, and others are the mounted squad for duty near Central Park, the mounted patrol for rural precincts, the harbour police, the 'police reserve' (for enforcing city ordinances), the Broadway squad (for aiding pedestrians in crossing the day), special service officers, and special officers who falls the duty of seeing that the streets are kept clean, and a bureau of street cleaning is appointed by the board to supervise this department. Another duty imposed upon the New York police relates to elections: all elections within the city are held under their supervision, and the votes are counted by the board, to whom the returns are transmitted. In 1897 the police force of New York was 3500 men, and of Brooklyn 12,000; and since the creation of 'Greater New York' in that year, the number of police has been proportionately increased.

**Australia.**—In the southern part of New South Wales the number of the police force is 1000; in Victoria, about as many; in South Australia, 500; in Queensland, 900; in Western Australia, 500; in Tasmania, 270; in New Zealand, 390.

See PRISON, JUSTICE OF THE PEACE; F. W. Maitland, Justice and Police (1882); Tiedemann, Police Power in the United States (1887); G. W. Hale, Police and Prison Discipline (1894).

**POLIGNAC,** an ancient French family, which claims to derive its name from a castle—the ancient *Apolliniacum*—in the department of Haute-Loire, and which since the 9th century possessed the district of Velay. Among its most famous members was Cardinal Melchior de Polignac (1661-1742), who was employed in diplomatic missions in Poland and at Rome, and received a cardinal's hat after acting as plenipotentiary of Louis XIV. at the peace of Utrecht (1712). On 4 July 1732 he was named minister of state, and the next year he was appointed Archbishop of Auch. Polignac succeeded Bossuet at the French Academy in 1704, and left unfinished the *Anti-Lucrétia* (1745), a poem intended for a rehabilitation of Lucretius. Some other members of the Polignac family are more notorious than noteworthy. In the reign of Louis XVI. Iolante-Martine Gabrielle de Palatson, Duchesse de Polignac (born 1749; died at Vienna, 9th December 1783), and her husband, Joseph Duc de Polignac (died at St. Petersburg, 1817), grand-nephew of the cardinal, were among the worst, but unhappily most favoured, advisers of Marie Antoinette. They obtained vast sums of the public money from their royal master and mistress, and were largely responsible for the extravagance of the court, and for the operations of the Duc de Polignac knew how they were hated, and were the first of the noblesse to emigrate. From the Empress Catharine of Russia the duke received an estate at St. Petersburg, and did not return to France at the Restoration.—His son, Auguste Jules Aimé de Polignac (1748-1817), who was ambassador at Versailles, 14th May 1780. On the Restoration he returned to France; became intimate with the Comte d'Artois, afterwards Charles X.; from his devotion to the policy of Rome received from the pope in 1820 the title of Prince; was appointed ambassador at the English court; and finally, in 1829, became head of the last Bourbon
ministry, in which capacity he promulgated the
ratal ordinances that cost Charles X. his throne.
He then attempted to flee, but was captured at
Granville on the 15th of August, was tried, and
carded to death on the scaffold in the Palace of
Ham, but was set at liberty by the amnesty of
1836. He took up his residence in England,
but died at St Germain, 2d March 1847. He was a
puzzle-headed man; 'a mere idiot' Guizot called
him to Bishop Wilberforce.—His son, Prince
Amherst (1812-90), was a leading monarchist.

Polishing. See French Polishing; also DIAMOND, GRAIN.

Polishing Slate, a mineral composed chiefly of
silica, with a little alumina, lime, oxide of iron,
and water; white, yellowish white, or yellow; and
of specific gravity about half that of water. It
is used for polishing glass, marble, and metals.

Politician. ANGELO POLIZIANO (Latinised Politianus) was
born at Montepulciano in Tusc-
any, on the 14th July 1525. His real name was
Ambrogini, but, in accordance with a common
practice at the Renaissance, he early called himself
by the Latinised form of his native town, which
Italianised into Poliziano is the name by which he
is known in his own country. His father, Bene-
detto, after the death of his own child, who was
assassinated by certain of his fellow-citizens, and
left his widow and five children so scantly pro-
vided for that, even after Angelo the eldest had
given the most signal proofs of his genius, he was
on the point of being taken from his studies and
put to a trade. At the age of ten he was sent to
Florence, then under Lorenzo de'Medici, the
brilliant centre of the Italian Renaissance.
Here he had as his teachers the most famous
scholars of his time, the Greeks Arcypophus and
Kallisto, and the Italians Landino and Ficino.
His progress in the ancient languages, the special
studies of the period, was extraordinary even in
that age of precocious talents. By his sixteenth
year he wrote epigrams in Latin and Greek that
excited the wonder of his teachers. At seventeen
he began the translation of the Iliad into Latin
hexameters, a work which it had been the ambition
of all the Italian humanists to achieve. The first
book had already been translated by another
scholar, and Politian at different periods carried
on the work to the end of the fifth. By his success
with the second book he was admitted into the Latin
circle of the 'Homeric youth,' and attracted the attention
of the great Lorenzo himself, who now stood his firm
friend and patron. Thus secure of a settled position
his life was thenceforward devoted to incessant
study, and he was soon recognised as the prince of
Italian scholars, and the most remarkable literary
genius of his time. At the age of thirty he became
professor of Greek and Latin in the university of
Florence, and the fame of his predications drew
students from every part of Europe, among whom
by his influence were the famous historians Bene-
lin, Grocyn, and Linacre may be specially mentioned.
Politian was also entrusted with the education of
Lorenzo's sons, Piero and Giovanni (afterwards Leo X.);
but their mother Clarice, who had ex-
cellent reason for doubting the genuine scholar-
ship of the director of her court, insisted on
his being removed from their immediate super-
tendence. In such occupation, varied by occa-
sional visits to other towns of Italy, Politian lived
at Fiesole in a villa assigned to him by Lorenzo,
who never left Florence. He died at Fiesole on
the 1st of February 1537. His death is the most
serious trial of his life, and he mourned his death in a
Latin elegy, which has been described as unique
alike in form and feeling in modern Latin poetry.
Two years later he himself died during the tem-
porary supremacy of Savonarola, whose religious
zeal was directed against every principle of
that pagan revival which it had been the life's work
of Lorenzo and Politian to forward. Politian's epi-
morphous was the first example of modern Latin
literature, and it is entirely in the ironical and sceptical spirit of that
movement of which he was so brilliant a repre-
sentative that its lofty closes any account of him-
self. It is as follows: 'Politian lies in this grave, the
angel who had one head and, what is new, three
tongues.'

Politian has the double distinction of being both
a scholar of the first rank and a poet of high merit
alike in Latin and in his mother tongue. Of
his industry as a scholar his translations of classical
authors (Eucletus, Herodotus, Hippocrates, Galen,
Plato's Charides, to mention a few of the long
series) are ample evidence, while his edition of the
Pandects of Justinian is regarded by modern
scholars as excellent even when tried by the latest
tests. His original works in Latin fill a thick and
closely-printed quarto, half of which is made up
of twelve books of letters, and the rest with his
poems in prose and verse. Among Neo-Latin
poets Politian holds perhaps the first place, his
peculiar distinction being that, while he is not
careful of classical purity, he has charged his verse
with a modern thought that is purely Italian, and he
was in Italian literature also he takes a high rank, both
in virtue of his own poetic production and as
having at a critical period given an impulse to the
cultivation of the Italian language. Before him
the Italian humanists regarded their native tongue
simply as a tool for the study of Latin, which, without serving the
needs of the people, but was beneath the attention of
scholars. The weight of Politian's name and example moved them to think differently, and
thereafterward Italian was secure of a place among
the other modern literatures. Of his productions
in Italian his Orfeo deserves special mention as
having been the first secular drama in the language.
As to his personal character, Politian had in full
measure the two great blemishes of the scholars
of the Revival of Letters, and notably those of Italy.
He was addicted to the lowest forms of vice, and
he knew no bounds to his abuse of those who had
the ill-fortune to offend him.

See Opera Ang. Politiani (Florence, 1499); Le Stanz, l'Orfo e le Rime di Messer Ano. Ambrogiati, illustrate da Giovan Carduccis (Florence, 1623); For accounts of Politian, see Biography of Life of Polizian', by J. A. Symonds, Renaissance in Italy, vol. ii.; Von Reumont, Lorenzo de'Medici (vol. ii. Eng. trans. 1876).

Political Economy is variously defined. According to the definition most generally accepted
in England, it is the science which is concerned
with the production, distribution, and exchange
of wealth. In Professor Marshall's Principles of
Economics it is defined as 'a study of man's
actions in the ordinary business of life; it inquires
how he gets his income, and how he spends it.'
The name 'The Elements of Political Economy'
dated only from 1615, having been first used (in this special sense, as
distinguished from domestic economy and moral
economy and from political theory) by Montelé-
tien de Vatteville in his Traite de L'Economie
Politique.

The science of political economy is a branch of the
study of man. Man is a creature with many
needs, which he seeks to satisfy by applying his
labour to the nature by which he is surrounded.
These needs are not a fixed quantity, but grow
and change with the development of society, as
man's devices for their satisfaction receive a cor-
responding development. In the growth of these
needs and of the devices to satisfy them we can
trace the economic development of the human
race. Political economy may be regarded as the
systematic and comprehensive study of the phenomena connected therewith. There have been economic facts therefore ever since the origin of man; but there was no real science of political economy from Adam Smith and his forerunners in France in the 18th century. Science generally is the systematic study of facts which existed before the study began. Yet, while political economy did not exist as an independent and comprehensive branch of human knowledge before the 18th century, much attention was given to particular economic facts. Various economic problems had received great and serious attention.

The history of political economy naturally falls into three divisions, the ancient, the medieval, and the modern. We shall treat them briefly in their order.

(1) The Ancient Period. — As in other sciences, the first notable efforts in economic reflection were made by the ancient Greeks. The leading Greek thinkers who handled economic questions were Plato, Aristotle, and Xenophon, who represented the idealism of the ancient world; Aristotle, the exponent of scientific realism; and Xenophon, who expounded the plain common sense of his time and country. Of the problems which they treated with the insight peculiar to their race we may mention first those relating to the economic aspects of the origin of society; the division of labour; the function of money; economics of slavery, which they considered a natural thing; property and the related question of communism; the dependence of political change and of revolution on economic causes; the population question. On these and other subjects the teaching of the great Greek writers is most valuable; nor is its value lessened by the fact that their discussion of economic facts forms only a part of the science of politics. And, while the conditions of the modern world differ so vastly from the Greek world, the economic views of thinkers like Plato and Aristotle will always have an interest for us, inasmuch as the solid groundwork of human nature continues substantially the same through the changing conditions of history.

Greek economics had no special interest or originality. The main contribution of the Romans in connection with political economy was to give legal form to the prevalent ideas of property.

(2) The Medieval Period. — During this period there was little discussion on economic problems that could now be called scientific. The most interesting feature of the economic views that then existed was the influence exerted on them by Christian teaching. This influence was most profound and greatly affected also the economic thinking of subsequent times. The influence of Christianity was especially manifest in relation to the weak and oppressed classes. It tended to soften and then to abolish slavery and serfdom; it raised the position of women and gave a new refinement to family life; the care of the poor became a first duty of men and of human institutions. The ideas and institutions of property prevalent in the Roman world, which were often harsh, severe, and cruel, were corrected by the spiritual ethics of Christianity. To the struggling and half barbarous feudal world it taught a nobler life and a higher conception of duty in the economic as in other spheres. It was the medieval economy, for a great part, an exalted and exalted poverty and resignation. In their opposition to the rigorous ideas of property some of the Fathers even advocated communism. The medieval period was a time of confused struggle, in which Christian ethics were often opposed not only to the rough and warlike egoism of the feudal races, but to the harsh economic ideas that were incorporated in the Roman law.

(3) The Modern Period. — The feudal communities were superseded by centralised monarchies; and the new system of the army and of the state, one, being attended by important changes in other spheres. The church lost much of its power. The feudal nobles were transformed into courtiers. The feudal militia gave place to professional armies in the pay and in the immediate service of the monarch. For the barons or peers of the realm and of the court and other dependents of the centralising ruler it was necessary first of all to have a sufficient revenue. And, as the old revenue in kind was neither convenient nor effective, it was found particularly desirable to have a revenue in money. Accordingly, it is the greater pressing functions of the statesmanship of that time to foster and to secure an ample revenue in money. The rise of the Colonial System (q.v.) on the discovery of America and of the sea-route to India, the great expansion of commerce thence resulting, the growth of the great commercial and industrial towns, the banking system, all these were regarded as elements in the strength of the centralised state, and were made subservient to its policy. Under these circumstances it was natural that special attention should be paid to the balance of trade; and that taxation should be raised to secure for their own country a good balance of the precious metals. Thus it became a special note of economic theory to place an exaggerated value on the precious metals. The Mercantile System (q.v.) was an expression of this exaggeration in the sphere of political economy. Economists differ as to the precise meaning and application of the phrase, and indeed it had no very precise meaning or application. The meaning of the phrase will naturally vary according as we confine the application of it to the exaggeration to which it specifically relates or extend it to the whole system of which the exaggeration was a conspicuous feature. But there can be no doubt that the system grew out of the needs and circumstances of the time. Its chief expounders were Bacon and Montesquieu de Vattelville in France, Antonio Serra in Italy, and Thomas Man in England. In practical statesmanship it is associated chiefly with the great names of Cromwell and Colbert.

Even during the prevalence of the mercantile system a new way of thinking on economics had arisen in England and France. Its keynote was freedom, and it too was an organic part of the social and political evolution of the time. The expounder of the new system was Adam Smith, but he was only the chief representative and culminating point of a movement which had been growing for more than a century. In England men like Locke, Joshua Child, William Petty, and Dudley North had been struggling more or less successfully towards a similar point of view. In France the school of Physiocrats, headed by Quesnay, had taught many of the new ideas; in particular they had been set forth with perfect lucidity and conciseness by Turgot in his Réflexions sur la Formation et la Distribution des Richesses (1766). In fact, Turgot's little book might be regarded as the first scientific exposition of political economy. Adam Smith's achievement was to give the fittest form to ideas which were becoming current among merchants and manufacturers, and to make commerce and industry the basis of a theory of political economy. His Wealth of Nations was the first thorough and comprehensive exposition of the subject by a man who had ample leisure and capacity, a remarkable knowledge of history, and an idea of the economic truth that no one else could witness.
defined as a system of natural liberty. In view of
of the ill-judged or antiquated regulations of the
past he advocated liberty; and to all that was arti-
ficial in such regulation he opposed a natural order,
that following the will of Rousseau in the return
to nature from a perverted civilisation. Indeed,
both in his assertion of freedom and in the appeal
to nature, Smith was only applying to political
economy principles that were dominant in other
sphere of the post-Roussean era. H e was the
example of his predecessors, and showed himself in
harmony with the new era, in regarding labour as
the source of wealth. With regard to other
economic questions relating to capital, rent, in-
terest, etc. Smith has said much which,
though it has not always gained the assent of subsequent
historians, has at least had the merit of starting
important discussion. Smith's pre-eminence as an
economist lies in the fact that he summed up and
presented in lucid perspective the best economic
thought of the times preceding, while his writings
were the starting-point of all further development.
The greatness of Smith becomes all the more
apparent when we contrast him with his suc-
cessors, for in none of them do we see the same
combination of humanity, moderation, and open-
mindedness, fullness of knowledge, width of view,
and following the school of Adam Smith, adhered to
the same qualities, but he fully applied them only
to the elucidation of a single aspect of the subject,
the population question. In Ricardo the historic
factor almost disappears in the abstract; his theory
of rent, for which he has been most noted, is
particularly abstract and artificial, and has born
much overrated. The main body of J. S. Mill's
economic work was simply a restatement of the
traditional doctrine, and as an achievement for
his time cannot be compared with what Smith did
for the 18th century. His later editions, as well as
the later editions of his Political Economy show a
perception of the fresh problems which are opening
up to the economist, but he never brought his
economic system as a whole into harmony with his
new views. His economic writings represent a
process of transition in which the old was not
fused or transformed by the new.
The political economy of Adam Smith had great
influence on the continent of Europe. J. B. Say
in France, and Ran and Hermann in Germany,
followed Smith more or less faithfully. But
Smith's school has never been altogether rejected
his teaching, has also met with strong opposition.
His doctrines have been variously criticised as
being too abstract and individualistic, as incul-
cating selfishness, as based on doubtful theological
assumptions. It is a special objection that his
tendency to individualism and cosmopolitanism
prevents him from seeing the importance of the
nation as an element in economic development.
Here we find the most fundamental point of differ-
ence between the economics of Germany and of
England. France and Germany are not the same
circumstances of the two countries. The national
element found conspicuous expression in the sys-
tem of List, who has been followed by the Ameri-
can economist Carey, the gist of this doctrine
being that the political economy of each country is
constituted by the peculiar conditions of its national development; in other words, that
circumstances render protection necessary to the
national life and growth of Germany and the
United States.
In the school of political economy which has long
been most prevalent on the continent of Europe
is usually described as historical. It holds that
economic factors must be studied in the light of the
historic conditions of each time and country—condi-
tions legal, political, social, and ethical. The
historical school is a protest against abstractness
and absoluteness in economic science. No reason-
able adherent of the school would deny that there
are permanent factors in economies, but all would
assert that even the most permanent elements are
subject to continual variation. That being so,
much will depend on whether the economist is
disposed to dwell on the stable or the variable
elements in economic development. Roscher
was the founder of historical school. He and Adolf
Wagner are its greatest recent exponent representatives.
Their works are true to the leading principle of
the school; they are studies of economic principles
conducted with all the lights which a vast histori-
ical learning can supply. Schlicht's is more than
historical, and he has given ample recognition to
the evolution principle in his Bau und Leben des
Sozialen Körpers.
At present it will be generally admitted by
students of political economy that the subject is
in an unsettled and unsatisfactory condition.
Various explanations of this may be given, but
the real and substantial grounds must be found in
the following great facts which have emerged since
the time of Adam Smith, and which seem to
necessitate a reconstruction, or at least a large
modification, of the science.
(1) The great increase in the study of history,
and the application of the historical method to all
departments of inquiry. The charge of neglect-
ing the teachings of history can be urged justly
enough against many of Smith's school; against
Smith himself, it is most unfair. It would be
absurd to say that an age which produced Smith
and Gibbon was entirely lacking in the historical
spirit; both men are amongst the finest examples
of it that have appeared. Yet they were only
isolated instances of a method which has now
become universal among competent economists.
The comparative study of history, and especially of
historical institutions, has practically come into
existence since their time, and has thrown entirely
new light on the growth and working of economic
forces.
(2) The general acceptance of the theory of
evolution, especially as taught by Darwin. We
can now see that Smith's theory of natural liberty
really meant that individual struggle for existence
carried on within the limits prescribed by law
which call the competitive system; and that the pro-
teptive system of the exceptional European continent
is only a moment in the struggle for existence
carried on between vast organised communities
like France, Germany, and Russia. In the United
States it may be considered as a moment in the
struggle for a better national existence against the
industrial power of England,
(3) The industrial revolution, whereby hand
labour has been superseded by machinery, and
individual effort has given place to labour organised
in vast industrial and commercial undertakings,
which as factories, railway and shipping companies.
This revolution was just beginning when Adam
Smith wrote his Wealth of Nations, which was
published in the very year when Watt produced
the first effective steam-engine (1776). The change in
industrial technique and organisation have been
vastly greater since Adam Smith's time than they
were in the whole period between Aristotle and
Smith.
(4) The growth of democracy, which took a
fresh start with the American revolution also in
the same year, when the popular edition of the
Wealth of Nations, in 1776, to be followed thir-teen
years later by the great French Revolution of
1789.
(5) The increasing prominence of the social
question, of which we need not further speak here.
It cannot be said that the current English economies have given due recognition to any of the above facts. Professor Marshall's important Principles of Economics (1890), while it is learned, thorough, and progressive in tone, and does considerably show the influence of new movements, is still somewhat the child of the tradition. The only prominent thinkers who give due recognition to the evolution principle in economics are Herbert Spencer and Schille.

It will be clear that the old abstract economics, of which Ricardo was the signal example, is now being replaced by a more realistic science. Most students of the subject will admit that we can best comprehend the present if we consider it as having grown out of the past, and if we can throw any light on the future, we can do so only by studying both the past and the present. In other words, the great function of the economist is to collect and analyse facts and to inquire into the action of the forces, whatever they may be, that determine the economic well-being of mankind. His aim must be on the one hand to avoid a servile adherence to the historical method, through which the doctrine of economic laws is developed by too elaborate apparatus of historical learning; and on the other hand to avoid the assumption that the economic conditions of our own time and country are and must be normal for all other times and countries. While the main body of economic inquiry must be the collection and analysis of facts, the best and most fruitful achievements in political economy accomplished by men like Quesnay, Turgot, Adam Smith, and J. S. Mill have been in forwarding human progress. Thus the ethical or ideal element has not been excluded from political economy but made a part of its subject-matter. It has informed and inspired the science in its noblest efforts. While political economy must start from an adequate basis of facts supplied by the cognate or subsidiary sciences, geology, geography, statistics, history, it must own allegiance to the supreme science of ethics. Progress in economic science will move in harmony with and promote the social and moral progress of the human race.

Political economy may be regarded as concerned with a vast process which is incessantly going on. This process begins and ends with human beings. The subject matter of which is found to stimulate men to those efforts for their satisfaction which are termed labour. But labour can create nothing; it operates by utilising natural objects, or as economists briefly express it, the land, which includes mines and the sea as well as agricultural land. In the history of civilisation a vast system of appliances have, under the name of capital, been developed and accumulated by the labour, ingenuity, and foresight of men for more effective operation on nature; thus we have the three factors of production, land, labour, and capital.

The distribution of wealth prevails in the most advanced countries these three factors of production are supplied by as many different classes of individuals, whose relations to each other are determined by free competition. Hence it is that the problems connected with distribution attain to primary importance in political economy. The share of the results of production obtained by the owner of land is rent; the share of the capitalist is called profits, consisting of interest, wages of management, &c.; the share of the labourer is simply the product of his own labours.

One of the most marked features in the recent economic history of the world is the enormous development of the means of communication and transport both by sea and land. In former times the bulk of the produce of labour was locally consumed by the producers themselves. The growing utilisation of steam and electricity has given rise to the great markets of the world, or we should rather say, to a great world-market, in which the exchange of the most varied commodities is carried on. Exchange had long been an important department of economics; it is now a dominant one. Out of exchange are derived the problems of supply and demand, of price, of value. The medium of exchange is money, also involving a wide complex of questions—banking, credit, &c.

The final aim of the whole economic process is the satisfaction of the needs from which it started. This satisfaction is only achieved when the commodities which are produced, distributed, and exchanged, but that they are used up not only for enjoyment, but for the production and maintenance of human energies. All human activity, whether it be viewed as the activity of individuals or of the great organised communities, such as states and nations, must rest on an economic basis, and must be more or less limited by the economic resources which it can command. As wealth consists of commodities which are derived from external nature and transformed in the process of production, some part of the wealth produced is inevitably returned to nature in a greatly altered form. The subject of consumption has been much neglected by political economists. The utilisation of the materials returned to nature, which are often considered as mere waste, but which could be scientifically applied to the recuperation of the exhausted powers of nature, has also been greatly neglected in economic technique.

The vast process which we have thus briefly sketched is for the most part a private matter. It rests with each individual to determine how he shall rest in the present and in the future. There is also a large public sphere connected with the state, the municipality, and other local bodies. It has almost universally been admitted that the state must provide for defence, justice, education, the larger means of communication, &c., and the necessary revenue is mostly drawn from the wealth of the citizens under the name of taxation. An enlarging set of functions, connected with lighting, water-supply, police, and to some extent education, are generally performed by municipalities and other local bodies, the funds for these being styled rates. Many of the older forms of society were marked by stability or stagnation, and the economic conditions under which they existed underwent little change. Yet economic history has also been a record of development. Labour in particular has gone through a distinct succession of changes, through slavery, serfdom, and the guild system, into the present system of free labour. Discontent has always been the mother of progress, and it is obvious that the economic changes of the present and the future must largely proceed from the discontent of the labouring class, especially from their discontent with the present distributive condition. Hence a group of important questions connected with trade-unions, co-operation, socialism.

It should also be said that the economic process is an organic one, that each link of the chain is connected with every other, and that the whole process is intimately related to the entire social, political, artistic, moral, and religious development of mankind. One of the greatest dangers to political economy (as to other sciences) is the excessive and exclusive attention which many of its facts are studied in isolation from the other branches of the science, and from the cognate provinces of human knowledge.
POLITICAL OFFENCES


Political Offences are generally exempted from the crime of Extradition (q.v.), by which a government agrees to arrest and surrender persons who have broken the law of a foreign state. A political offence may be defined as an offence committed in carrying on a civil war or open insurrection. In November 1839 the English judges had to decide whether the Swiss government could demand the extradition of one Castioni, who was proved to have shot a member of the ministry during a revolution excited by the Liberals in the canton of Ticino. There was some evidence that the murder was committed by private persons, and that the judges held that his act was privati esse political, and gave him the benefit of the exception in the treaty. The Conspiracy Bill of 1858, introduced after Oarain's attempt on the life of Napoleon III., proposed to make conspiracy to murder a felony instead of a misdemeanour. It was intended to secure the French emperor against plotters in England, and caused the fall of Palmerston's government, as being contrary to English traditions. As between a government and its subjects political offences have often been treated with more severity as may be seen on the following pages in the Roman law relating to peritullio and lexu majestas. In France and Scotland the law of treason was framed on the model of those laws which had been made to protect the person and government of the crown from external attack and risk. The ancient Roman state; the old English law of treason was also extremely severe. In modern times the tendency is to treat offences against the state according to the ordinary principles of criminal law. There are, however, two kinds of crime which raise political questions of some interest. (1) Crimes committed in the territory of one state against the government of another. The Foreign Enlistment Acts were passed to enable the British government to deal with persons who levy troops and prepare armaments against a foreign government within British territory. Some members of authority have censured the American government for permitting Fenians within its jurisdiction to levy war against the British empire. (2) Crimes committed by persons who honestly think they have a grievance against a government of their own country. In such cases the political motive is not, in law, regarded as an excuse; if e.g. a member of parliament incites to a breach of the law, magistrates and prison authorities must deal with him as with any other offender. A humane government will often extend special indulgence to political offences. Whether such indulgence should be granted (whether e.g. an Irish member in prison should be exempted from ordinary prison rules) is a subject of discussion for not of legal right. The dynamiwhos who in 1882-83 attempted to the destruction of English public buildings were properly treated as mere criminals, without regard to any alleged political aims.

Politics (Gr. politis, 'city' or 'state'), that branch of ethics which has for its subject the proper model of a government and its tendency to secure its prosperity, peace, and safety, and to attain, as perfectly as possible, the ends of civil society. Among the subjects which political science embraces are the principles on which a government is founded, the hands in which the supreme power may be most safely lodged and vested, the rate and obligation of the governing and governed portions of society, the development and increase of the resources of the state, the protection of the rights and liberties of the citizens, the preservation of their morals, and the defence of the independence of the state against foreign invasion.

While the philosophy of government constitutes the science of politics, the art of politics consists in the application of that science to the individual circumstances of particular states. The ancient Greeks had no concept of politics with reference to an ideal perfect state, which each propounded according to his own speculative views, pointing out the variation of every existing government from his standard. The 'politics of a country' implies the course of its government, more especially in its relations with foreign nations, than in its constitution and institutions.

In the articles on the several countries a sketch of the constitution is in most cases given. See also AMBASSADOR, Anarchism, Anthropology, Aristocracy, Balance of Power, Cabinet, Congress, Democracy, England, History of Political Ideas, International Law, Nationalism, Parliament, Republic, Representation, Socialism, Tribe, Whigs and Tories, &c.; and the articles on the expounders of famous political theories—Plato, Aristotle, More, Machiavel, Bentham, Lassalle, Marx, &c.

Poliziano. See Politian.

Polk, James Knox, eleventh president of the United States, was born in Mecklenburg county, North Carolina, November 2, 1839. His ancestors, who bore the name of Pollock, emigrated from the County of Ireland to his father's grandfather in the 18th century, to the state of South Carolina, and to the state of Tennessee in 1825. He was educated in the University of North Carolina, and studied law with Felix Grundy of Tennessee, an eminent lawyer and statesman. Admitted to the bar in 1829, he was three years after elected a member of the legislature of Tennessee, and in 1835 returned to congress by the Democratic party. In 1835 he was chosen speaker of the House of Representatives, a position he filled during five sessions with firmness and ability. After serving fourteen years in congress, he was in 1832 elected governor of Tennessee; but he failed to secure re-election in 1841 and 1843. In 1844 he was nominated as a compromise candidate for the presidency, against Henry Clay, and elected by a popular majority of only 38,000, out of 175 electoral votes to 105. His cabinet included James Buchanan as secretary of state and Bancroft, the historian, as secretary of the navy. Polk's firm attitude with regard to the annexation of Texas had mainly secured his election, and he carried out the policy to which he was committed, with prudence and firmness. In his first message to congress, in December 1845, he announced that the western bank of the Nueces River, beyond which Texas had not exercised jurisdiction, was already occupied by American troops. On September 12th Texas was admitted to the Union; on the 31st jurisdiction was extended to the disputed territory beyond the Nueces.
These proceedings failing to goad the Mexicans into a declaration of war, the president forced on himself the responsibility of the situation by announcing the suggestion of General Taylor, to the Rio Grande. Palo Alto and Resaca followed, and the Mexican war was successfully started; the capital was taken in September, and its fall enabled the conquerors to dictate terms of peace, by which the United States acquired California and New Mexico.

During Polk’s term the Oregon boundary was settled by a compromise (49°) offered by England, though the party cry (‘Fifty-four-forty or fight’) which helped to elect him was a claim for the entire territory to 49° 40' N. lat. In 1846 a revenue tariff in force from 1827 to 1831, which included specific and minimum duties, was adopted—in the senate, however, only by the casting vote of Vice-president Dallas. Polk consistently denounced the anti-slavery agitation; he did not believe in the possibility of a United States all slave or all free, and considered the modus vivendi between North and South quite satisfactory. Having pledged himself to a single term of office, he refused a renomination, and retired to his home in Nashville, Tennessee, where he died three months afterwards, June 15, 1849. Polk was a man of habits, firm, both in business and religious character. He was devoted to the principles of the Democratic party of Jefferson and Jackson—state rights, a revenue tariff, independent treasury, and strict construction of the constitution.

See Life by J. S. Jenkins (1850), and a History of his administration, by Ennio B. Chase (1850).

Polk, Leonidas, the Antony Belknap of the Confederacy, was born at Raleigh, North Carolina, 10th April 1806. He was a cousin of President Polk, and grandson of Colonel Thomas Polk, an officer of the Revolution. Graduating at West Point in 1827, he received a commission in the artillery, but was induced to study for the ministry, and in 1830 received deacon’s and in 1831 priest’s orders in the Episcopal Church. In 1838 he was consecrated Bishop of Arkansas and Indian Territory, with charge of the dioceses of Alabama, Mississippi, and Louisiana; in 1841 he resigned all these except the bishopric of Louisiana, which he held until the Sixth November, 1843, or ten years, until his death. Soon after the outbreak of the civil war he was offered a major-generalship by Jefferson Davis, and, accepting it, proceeded to strongly fortify strategical points on the Mississippi. At Belmont, in November 1861, he was driven from his camp by Grant, but returned and eventually compelled him to retire. At Shiloh and at Corinth he commanded the 1st corps; in October 1862 he was promoted to lieutenant-general, and in November he conducted the retreat from Kentucky. After Chickamauga, where he commanded the right wing, he was relieved of his command, but in December 1863 he was appointed to the department of Alabama, Mississippi, and Eastern Louisiana, and he afterwards joined Johnston in opposing Sherman’s march to Atlanta. He was killed while reconnoitring on Pine Mountain, 14th June 1864, by a cannon-shot fired by some Northern officers who wished to give the bishop’s party a fright. See the Life by W. M. Polk (1894).

Polka, a species of dance, of Bohemian origin, invented in 1830, and introduced into England in 1843, the music to which is in 2 time, and has the rhythmical peculiarity of being accented on the third, fourth, and seventh measures.

Pollack (Gadus pollachius), a common fish on British coasts, belonging to the cod, haddock, and whiting genus. It is about the size of the coal-fish, is active in habit, and is frequently caught. The lower jaw projects beyond the upper, and there is no barbel. In Scotland and in some parts of Ireland it is called Lythe.

Pollaiuolo, Antonio, goldsmith, medalist, metal-caster, and painter, was born at Florence in 1439, and died at Rome in 1498, whether he had been summoned to cast a sepulchral monument for Pope Sixtus IV., and where he also cast a similar one for Pope Innocent VIII. (died 1492), both in St Peter’s, and both works of great merit. Antonio’s pieces—‘the best being ‘Hercules slaying the Hydra’, ‘Hercules destroying Antaeus’, and ‘St Sebastian’—are distinguished for the life and vigour of their drawing. His brother Pietro, born at Florence in 1448, and died at Rome in 1496, was generally associated with him in his work, though he devoted most attention to painting. To him are attributed an altarpiece introducing SS. James, Vincent, and Eustace (if indeed it is not mainly by the other brother), an Annunciation, a Coronation of the Virgin, and the Five Virtues.

Pollan (Coregonus pollan), a fresh-water fish of the family Salmonidae, a native of lakes in Ireland. It is particularly abundant in Lough Neagh, where great numbers are often netted, and sold in the neighbouring country. The fish is from 10 to 12 inches in length, and is well flavoured. See Coregonus.

Pollanarrua, a ruined city of Ceylon, 60 miles N.E. of Kandy, with a massive dagoba, a rock-cut temple, masses of sculptured stones, and a wide area of ruined buildings that attest the size and importance of the city, which became the capital of the kingdom about 770, after the Malabar invasion ruined Annadhunapura, the former capital. The city stood on the site of an immense tank, still called Topaweva or Topare. The place was first made known to Europeans in 1820.

Pollarding (to poll, to cut off, or shave the head) is the cutting off of the whole crown of a tree, leaving it to send out new branches from the top of the stem. Trees thus treated are called pollards. The new branches are never equal in magnitude to the original branches of the tree, although often more numerous, and when pollarding is often repeated the scars and stumps form a thick ring at the base of the tree, and the sapwood within branches spring. Pollards are not beautiful; but pollarding is practised with advantage in districts where fuel is scarce, the branches being cut off in order to be used for fuel, and the operation repeated every third or fourth year. Willows, poplars, alders, elms, oaks, and limes are the trees most frequently pollarded, chiefly for the sake of the bark of their branches, and the whole treatment very much resembles that of copse-wood. See COPE.

Pol len. See (under Flower) FERTILISATION OF the Flower; also the article STAMENS.

Pollio. Caius Asinius, an orator, poet, historian, and soldier, was born in Rome, 76 B.C. He sided with Caesar in the civil war 49 B.C., with Virgil at Pharsalia, and commanded in Spain against Sextus Pompeius, but was defeated. He sided with the triumvirs against the oligarchic senate, and was appointed by Antony to settle the veterans on the lands assigned them in Transpadane Gaul. It was then that he saved the property of the poet Virgil at Mantua from confiscation. After Antony and Octavian had quarrelled, it was Pollio who effected their temporary reconciliation at Brundisium (40). This year he was consul, when Virgil's fourth
POLL-TAX

1814-16, the Poll-tax was first established to raise funds for the Napoleonic Wars. It was unpopular and soon replaced by the Income Tax. After the defeat of Napoleon, the Poll-tax was abolished in 1842.

1742, a minor Scottish poet, was born in Glasgow. He studied at the University of Glasgow and the Divinity Hall of the Secessions Church, and was licensed to preach in 1827. He published his first book of poetry in 1832, titled Tales of the Covenanters anonymously before his poem. See the memoir by his brother (1843); Rosaline Masson. Pollak and Asytown (Famous Scots), 1890.

Pollok, a minor Scottish poet, was born in 1799 at Muirhouse, in the parish of Eaglesham, Renfrewshire. He studied at the university of Glasgow and the Divinity Hall of the Secessions Church, and was licensed to preach in 1827. He published his first book of poetry in 1832, titled Tales of the Covenanters anonymously before his poem. See the memoir by his brother (1843); Rosaline Masson. Pollak and Asytown (Famous Scots), 1890.

Pollokshaws, a manufacturing town of Renfrewshire, on the White Cart, 3 miles SSW. of Glasgow. It derives its name from the 'shaws' or woods of the estate of Pollak, held for more than six centuries by the Maxwells. It was made a burgh of barony in 1814; and its industries, first started in 1742, now comprise power-looms, bleaching, iron-founding, paper-making, &c. Pop. (1841) 4627; (1881) 9363; (1891) 10,228.

Poll-tax, or Capitation Tax, a tax levied by the poll or head (per capita). In England the imposition of a graduated poll-tax (varying from 4d. to £4, according to rank and wealth) in the time of Richard II. led to Wat Tyler's rebellion in 1381. A simple poll-tax was imposed in 1513; and an unpopular tax (varying from 12d. for a private person to £100 for a duke) was assessed in 1678 and abolished in 1688. In the United States most states impose a poll-tax or capitation tax as a poll-tax, or Capitation Tax, a tax levied by the poll or head (per capita). In England the imposition of a graduated poll-tax (varying from 4d. to £4, according to rank and wealth) in the time of Richard II. led to Wat Tyler's rebellion in 1381. A simple poll-tax was imposed in 1513; and an unpopular tax (varying from 12d. for a private person to £100 for a duke) was assessed in 1678 and abolished in 1688. In the United States most states impose a poll-tax or capitation tax as a poll-tax, or Capitation Tax, a tax levied by the poll or head (per capita). In England the imposition of a graduated poll-tax (varying from 4d. to £4, according to rank and wealth) in the time of Richard II. led to Wat Tyler's rebellion in 1381. A simple poll-tax was imposed in 1513; and an unpopular tax (varying from 12d. for a private person to £100 for a duke) was assessed in 1678 and abolished in 1688. In the United States most states impose a poll-tax or capitation tax as a poll-tax, or Capitation Tax, a tax levied by the poll or head (per capita). In England the imposition of a graduated poll-tax (varying from 4d. to £4, according to rank and wealth) in the time of Richard II. led to Wat Tyler's rebellion in 1381. A simple poll-tax was imposed in 1513; and an unpopular tax (varying from 12d. for a private person to £100 for a duke) was assessed in 1678 and abolished in 1688. In the United States most states impose a poll-tax or capitation tax as
POLO

condition of the sufferage; the sun being generally $1, but in some states only 50 cents, and in others varying from year to year, but not exceeding $8. A considerable number have no such tax; in others the imposition of a poll-tax is expressly prohibited by the constitution. Tax.

Polo, an equestrian game, which may be shortly described as hockey on horseback. It is of oriental origin and of high antiquity; indeed, it has been claimed that it can be traced back to 600 B.C. The accompanying illustration is from a beautifully illuminated Persian MS. of the poems of Hafiz, executed in the year 956 of the Hegira or 1549 of the Christian era, and now in the Bodleian Library, Oxford, by the permission of whose standing what is required of them. It is part of the game so to ride alongside an opponent as to prevent him from hitting the ball, but it is not allowed to ride across in front of an opponent. To become a good player requires strength, good horsemanship, and a keen eye, as well as a sound

See Captain G. F. Youngusband's Polo in India (1890), and the chapter on 'Polo' by J. Moray Brown in Riding (Badminton Library, 1891.).

Polo, Marco, the greatest of medieval travelers, was born of a noble family of Dalmatian origin, at Venice, in 1254. His father, Niccolò Polo, and his uncle, Malteo Polo, both enterprising merchant-adventurers, went on a mercantile expedition, visiting Constantinople, the Crimea, and the court of Bura Khan at Samarkand. They first travelled round the north side of the Caspian Sea to Bokhara, and then fell in with some envoys returning from Hulagu in Persia to his brother the Great Khan Kubilai, and by them were persuaded to accompany them to Cathay. They were well received by Kubilai, then either at Cambaluc (Peking) or his summer residence at Shangtu (Coleridge's Xanadu), north of the Great Wall. He listened eagerly to their reports concerning the trade and government of the four empires, and commissioned them as envoys to the pope, bearing letters requesting him to send 100 Europeans learned in the sciences and arts, to act as instructors to the Mongols. They reached Venice in 1269, found Rome in the confusion of a long interregnum, and, after the new pope (Gregory X.) was elected, could only get two Dominicans, and even these had hardly commenced the journey when they lost heart and turned back. The Polos made their final start in the November of 1271, taking with them young Marco, and arrived again at the court of Kubilai Khan in the spring of 1275, after travelling by Sivas, Mosul, Bagdad, Hormuz, through Khurasan, up the Oxus to the Panir, by Kashgari, Yarkand, and Khotan, Lob Nor, and across the great desert of Gobi to Tungtu, thence to Shangtu. Their second reception was still more honourable than the first, and the Khan took special notice of Marco, from the rapidity with which he learned the customs and language of the Mongols. His wisdom and intelligence also recommended him as a fit envoy to the various neighbouring rulers; and during his residence at their several courts Marco observed with great care the manners of each country, and delivered on his return a detailed report to the khan. In various missions he visited the western provinces on the borders of Tibet, Yunnan, northern Burma (Mien), Karakorum, Champa or southern Cochin-China, and Southern India. For three years he served as governor of the town of Yung-chow, and with his uncle helped to reduce the city of Saiansfu by constructing mangonels for casting stones. The khan long refused to think of the Polos leaving his court, but at length in the beginning of 1295, obtaining permission to join the escort of a Mongol princess, who was travelling to marry Arghun, khan of Persia, grandson of Kubilai's brother Hulagu. They sailed from Chwai-chow in Fuki (Zaitian), but were detained long on the coasts of Indo-China, and finally reached Persia after two years had passed. Two of the three envoys and most of their attendants had perished. Arghun Khan himself was dead, but the three Polos and the young princess were safe, and she married the late khan's brother and successor, Arghun, as the daughter of the native city about the end of 1295, and Ramusio tells the story how like Ulysses they were recognised by none of their kinsfolk, and repulsed from the door. They brought with them much wealth in the portable form of precious stones, the fruits

authorities it has been specially photographed to illustrate this article. It bears the following legend: 'Welcome to the meddian, thou chief of horsemen: strike the ball.' Polo was first played by Europeans in 1863 in Calcutta, whither it had been brought by officers who had been stationed in Cashgar in Assam, where polo has been played since time immemorial by the hill-tribe of Manipur. Almost the same game exists in Tibet; whilst native equestrian games more or less closely resembling polo are played in Japan and other parts of the East. Since 1871 many polo clubs have been started in Britain and, since 1876, in America, as well as wherever Britons are found in the East. The principal British club, which makes the rules of the game, is at Hurlingham, near London. The following is a short description of polo: An oblong space of turf is marked out, of which the proper size is 300 yards by 200 yards; at each end in the centre of the line two poles are fixed 22 feet apart, forming the goals through which it is the object of the opposing sides to strike the ball. The players are mounted on ponies, the size of which has a definite place (numbered one, two, three, and back) in relation to friends and opponents; and in polo, as in most games, combination is perhaps the first condition of success. The ponies have to be carefully trained, and some acquire wonderful cleverness in under-
of their trading. In 1298 Marco fought his own galleys in the great battle of Curzola, in which the Venetians under Dandolo were defeated by the Genoese under Doris, and was taken prisoner and imprisoned for a year on the island of Rapallo; later, in about 1298, Marco dictated to another captive, one Rusticiano of Pisa, an account of his journey through the East. After his liberation he returned to Venice, where he died in 1324, and was buried in the church of S. Lorenzo. The traveller bore among his contemporaries the name of Marco Polo. In 1299 he published his Practica Monilien, most probably from his having frequently used that word in his attempts to describe the wealth and splendour of the khan. The wonders he narrated seem to have excited incredible—

even long after he left Venice. Boucicaut commends the circumspection of the reader who, "shall carry a wary eye on Paulus Venetus, Jovius, Olaus Magnus, Nicerbergins, and many others."

Marco Polo's book consists of two parts: (1) a Prologue, the only part containing personal narrative; (2) a long series of chapters descriptive of notable sights, manners of different states of Asia, especially that of Kublai Khan; and ends with a dull chronicle of the interminable wars of the House of Genghis during the second half of the 13th century. See Marco Polo succeeds in almost entirely eluding the intellective, his subject is how he consciously revealed to the eyes of his reader as a man truthful, brave, shrewd, keen-eyed, grave, of few words, fond of sport, with all the due respect of the prosperous man for wealth. He shows throughout a singular lack of humour—Sir Henry Yule's style is a good instance. But when he has to tell of so strange a custom as the conversation among the Gold-teeth on the frontier of Burma. He is no less sparing of scientific observations, and his geographical data are not infrequently the reverse of clear and adequate. He tells us that he acquired the language of every nation in the Mongol empire, and as many as four written characters, but of these Sir Henry Yule thinks Chinese was not one. His work is poorer in information relating to the Chinese proper than anywhere else. Thus, he does not mention the Great Wall, nor yet customs so striking and distinctive as the use of tea, the compressed feet of the ladies, the fishing concomitant, artificial egg-hatching, nor the printing of books. An absurd assertion has been made that block-printing was carried to Europe by our traveller, by him shown to one Panfilio Castald, from whom it was learned by John Fans, of Mainz; and indeed the printers of Lombardy, misled by patriotic feelings, have stultified themselves by erecting a statue at Feltre to Castald, "the illustrious inventor of movable printing types."

Polyanthus (Gr., 'many-flowered'), a kind of Primrose (q.v.), much prized and cultivated by florists. It is generally believed to be a variety of the Common Primrose (Primula vulgaris), produced by cultivation, in which an amulet of numerous Polyanthus.
flowers is supported on a common scape (leafless flower-stem), instead of each flower rising on its own stalk from the crown of the flower-cluster; a modification to which a tendency often appears in the wild plant itself. Thus in its habitat it somewhat resembles the cowslip and oxlip, whilst in the size of its flowers it is more like the common primrose; but instead of the pale uniformity of the wild plant it exhibits great variety of different shades and colours.

The subvarieties are innumerable, new ones being continually produced from seed, and of short duration. The seed is sown about midsummer, and flowers may be expected in abundance next year, if the young plants are properly protected. The first few years are the most difficult. Polyanthus loves shade and moisture more than its congener, the auricula. It is very hardy, and seldom suffers from the most severe winters. Fine kinds are preserved for a time by dividing the roots. The cultivation of the polyanthus is prosecuted with particular assiduity and success in England. For the Polyanthus Narcissus, see Narcissus.

Polybius, the Greek historian, was born about 204 B.C. at Megalopolis in Arcadia. From his father Lycurgas, one of the leading men of the Achaean League, he received valuable instruction in literature and science, and his early studies were interrupted by war. He was one of the 1000 noble Achaeans who, after the conquest of Macedonia in 168, were sent to Rome on the ground that the Achaeans had failed to assist the Romans against Perses. Without any trial the Greeks were detained in an honourable captivity. Polybius was the guest of L. Aemilius Paulus himself, and became the close friend of his son, Scipio Aemilianus, accompanying him in his military expeditions. Polybius in his turn derived much advantage from the protection and friendship of Scipio, who gave him access to public documents, and aided him in the collection of materials for his great historical work. In 151, after sixteen years in Italy, the surviving Achaean exiles were permitted by the Roman senate to return to Greece; Polybius, however, soon rejoined Scipio, followed him in his African campaign, and was present at the destruction of Carthage in 146. But the outbreak of war between the Achaean and Romans summoned him again to Greece, where he arrived soon after the taking of Corinth. All his influence was now exerted to procure from the conquerors favourable terms for the vanquished; and in his writings and discourses he overlooks several long journeys—to Asia Minor, Egypt, Upper Italy, southern France, and even Spain—where it has been supposed he witnessed the capture of Numantia by Scipio in 133. He died about 122 B.C.

His history, the design of which was to show how and why it was that all the civilized countries of the world fell under the dominion of Rome, includes the period between 220, where the history of Aratus concluded, and 146 B.C., the year when Corinth fell, and with it the independence of Greece. Much the greater part of the work has perished, and only about 9000 of the 300,000 words of the ancient manuscript have been preserved complete; but the plan of the whole work is fully known. Of the two parts into which it was divided the first (books i.-xxx.) ; the introductory books i. and ii. being a sketch of the earlier history of Rome) embraced a period of fifty years, commencing with the Second Punic War and the Social War in Greece, and concluding with the subjugation of the Kingdom of Macedon in 168. The last ten books deal with the years 148-146. The great merits of Polybius are the care with which he sifted his facts, and the evidence of truth, his breadth of view, and his sound judgment, which was materially assisted by his familiarity with political and military life. He was an excellent authority on the art of war. His tone is didactic, dull, and wearisome; he is too anxious to draw consequences and deduce lessons, and has been called 'the first pragmatician.' His method of exposition is careless, somewhat confused, and inartistic; his style, occasionally pithy, but usually dull to a degree, belongs to the period of beginning decadence.

Of the three authors which have not been preserved entire we possess merely fragments or extracts. Fragments were found by Cardinal Mai, and published as late as 1827. Valuable editions have been published by Schweighauser (1795-96; new ed. Oxford, 1831), Bekker (1844), Dindorf (1862-68; new ed. 1882), Hultsch (1868-72; 2d ed. 1888). The portion on the history of the Achaean league has been edited by W. W. Capes, and selections (based on Hultsch) by Strachan-Davidson (1888); there is a readable English translation by W. H. Shuckburgh (1889). See Mahaffy, The Greek World under Roman Swaty (1890); German works on Polybius by La Roche (1867) and Pichler (1880); and R. von Scalla, Die Schriften des Polybius (1899). Polybius was a follower of Cato the younger.

Polycarp, one of the 'Apostolic Fathers,' was bishop at Smyrna in proconsular Asia during the earlier half of the 2d century. He is an important name, for he bridges the little known and much controverted period lying between the age of his master the Apostle John and that of his own disciple Irenæus, and his testimony is the larger, clearer, and more valuable because of his rigid conservatism and lack of intellectual individuality. The 'Life' by Irenæus is utterly unworthy. All that is really known of Polycarp's origin is given by himself; from himself we know that he was born about 60 A.D., and probably of Christian parents. By the migration of apostles and others from doomed Jerusalem, Ephesus and the neighbouring districts became the new home of the faith, and there Polycarp was 'taught by Apostles,' John above all, and 'lived in familiar intercourse with many that had seen Christ' (Irenæus, Hœreses, iil. 3, 4). The further statement that he was appointed bishop in Smyrna by l'Apostles' ("by John"—Tertullian) is probably coloured by the later conception of the episcopate, but it is certain that he appears to have been head of the church from early manhood.

Among contemporaries he was intimate with Papia. More interesting is his brief intercourse with Ignatius, who, on his way from Antioch to martyrdom at Rome, made a short stay at Smyrna, where Polycarp and the church ministered to him. The tone of his Epistle to Polycarp, written shortly after from Troas, is that of a letter to one less experienced, if not younger, and less energetic than the writer, but high respect is paid to Polycarp's steadfastness, piety, and position. In consequence all that is lost which the apostles, the church and the churches to send messages to Antioch, the Philippians wrote to Polycarp asking that their letter to Antioch might be forwarded by the Smyrnaean messenger, at the same time inviting exhortation, and further asking for any of the 'sacred writings' that were藏着 that the Philippians might have Polycarp's Epistle to the Philippians, in which he accedes to their various requests, and solicits further news of Ignatius. His influence on a younger generation, and his importance as a faithful preserver of the apostolic tradition, are vividly depicted by his intercourse with Flavianus in his Epistle to Flavianus, quoted in Eusebius, Hist. Eccl. v. 20: 'I can tell the very place where the blessed Polycarp used to sit and discourse... Whatso-
ever things he had heard from them (John and others) about the Lord... Polygamy, as having received them from eye-witnesses of the life of the Word, would relate altogether in accordance with the wider range of the subject. On this point neither yielded to the other, yet their relations remained so cordial that Anicius allowed Polygamy to take his place in celebrating the eucharist (see Irenaeus quoted in Eusebius, Hist. Eccl. v. 24). After turning many Valentinians and Marcionites from their heresies by his preaching, the aged bishop returned to Smyrna, only to win the martyr's crown in a persecution which broke out during a great festival. Unsatiated with meaner victims, the mob called for Polygamy, 'the father of the Christians.' With true dignity and modesty he despised the man. Betrayed by his servant-boy, but offered his life by the proconsul if he will revile Christ, he answers: 'Fourscore and six years have I been His servant, and He hath done me no wrong. How then can I blaspheme My King, who hath saved me?' As the proconsul were over, a fire was substituted for death by wild beasts, and Jews vied with heathens in providing fuel. But the fire arched itself about the martyr, and he had to be despatched with a dagger. The graphic Letter of the Smyrnaeans tells the story of the martyrdom to the Philippians, and the chronological appendix to this letter has been elucidated by Waddington's skilful dating of the 'proconsul,' and his conclusions have been confirmed by the discovery of inscriptions relating to the 'high-priest,' also mentioned therein, so that the martyrdom may, with strong probability, be dated 29th February 155 A.D.

The only writing of Polygamy extant is the Epistle to the Philippian, incomplete in the original Greek, but complete in a Latin translation. Its genuineness has been assailed, but in itself, it is of great value for questions of the canon, the origin of the church, and the Ignatian Epistles. More New Testament phrases are here inviolate than are found in any other work of the time. The epistles and especially the appendices, given to Paul and his epistles by this disciple of John, tell heavily against Tübingen theories of the origin of the church and the canon. The letter bears so closely on the Ignatian Epistles that, while apart from it the external evidence for their genuineness is weak, with that evidence is very strong. The grounds, however, for assigning the epistles of Ignatius and Polygamy to the reign of Trajan are not beyond question, while among other things a certain reference to heresy in Polygamy's epistle would better accord with a time about 150 A.D., or even later.

For one of the best editions of the Epistle (first edited by Halloix in 1633 and frequently since), see Patrum Apostol. Opera (ed. Gehhardt, 22 vol. ii. 1876) for the date of the martyrdom, Waddington's Fastes des Provinces de Provence, 1872, and the Oxford Studia Biblica (1885 and 1890). But the best and most exhaustive work on all the parts of the subject is Lightfoot's Apostolic Fathers, part ii. (24 octavo vol. ii. 1883), and a scholarly, and able attempt is made by the Rev. J. M. Cotterill in the Cambridge Journal of Philology (1891) to atriute the extant epistle to Antiochus, a monk of St. Basil, which he supposed under the name of Polycrates. But the ground thus alleged under the name of Polycrates is still extant; 'if,' in Gibbon's phrase, 'what no one may be said to be extant,' a dull and feeble work entitled Πάνταδικα τί ἄξων ἀράβιστ, divided into 130 homilies.

Polycotyle'donous Plants are those whose embryos have more than two seed-leaves (cotyledons). Examples are found occasionally, or as monstrousities, among Dicotyledons, in the Pine (Pinus) group of the Conifere. The polycotyledonous condition is the normal one, and the cotyledons occur in whorls of from three to ten. Multiplication of cotyledons occurs in a few other groups of the Conifere. Sometimes the numerous cotyledons unite in pairs, and this leads to the suggestion that they originally sprang from two; but many botanists believe that the cotyledons arise as separate leaves.

Polyerates, 'tyrant' of Samos from about 336 B.C. to 322. He conquered several islands of the Arcipelago, and even some towns on the Asiatic mainland, waged war successfully against the inhabitants of Milletus, and defeated their allies, the Lesbians, in a great sea-fight. His intimate alliance with Amasis, king of Egypt, proves the importance in which this daring island-prince was held even by great monarchs. According to Herodotus these successes were mainly owing to the jealous gods must be preparing for so lucky a mortal, and wrote a letter to Polyerates, earnestly advising him to throw away the possession that he deemed most valuable, and thereby avert the stroke of the sibylline gods. Polyerates, in compliance with his friend's advice, sent a signet ring of marvellously beautiful workmanship into the sea, but next day a fisherman presented the tyrant with an unusually big fish that he had caught, and in its belly was found the identical ring. It was quite clear to Amasis now that Polyerates was a doomed man, and he immediately broke off the alliance. When Cambyses invaded Egypt (525) Polyerates sent him a contingent of forty ships, in which he placed all the Samians disaffected towards his tyranny, hoping they might never come back; but mutinying they returned to Samos, and made war against the tyrant, but without success. Hereupon they went to Sparta, and succeeded in securing the help of both Spartans and Corinthians. A triple force of Samians, Spartans, and Corinthians embarked for Samos, and Amasis hurried the nautical Polyerates became more powerful than ever; but Nemesis overtook her victim after all. Orestes, the Persian satrap of Sardis, had conceived a deadly hatred against Polyerates, and, having enticed the latter to visit him at Magnesia, appealed to his cupidity, he was crucified, and crucified Polyerates.

Polydipsia. See DIABETES.

Polygalaceae. See MILKWORTS.

Polygamous, a term applied to plants which bear both unisexual and hermaphrodite flowers, either on the same or on different individual plants. For example, the maple produces male, female, and hermaphrodite flowers on the same tree; while some wild-plums sometimes bear male, female, and other flowers, as well as hermaphrodite flowers.

Polygamy (Gr. poly, 'many,' gaimein, 'to marry') includes ethnologically the social arrangement by which one wife has many husbands, now usually termed Polyandry (q.v.), as well as that in which a man has or may have several or many wives. To the latter the term polygamy is, however, practically restricted. Formerly polygamy was thought to be probably the original type of the development which has culminated in the marriage relations of civilised peoples; that this is not so is suggested somewhat fully in the articles FAMILY and MARRIAGE.

Polygamy certainly obtained at one time over a very large area of the world's surface; in general it may be said still to be the rule not merely amongst most African races, but amongst the peoples, both
more and less civilised, of 'the East' generally, and to a certain extent in Australia and Polynesia, though it is rare amongst American Indians. That there are many cases of polygamy, even in countries (q.v.) has been always treated as sinful, and polygamy is a crime by the law of Christian states. Greeks and Romans did not practise polygamy within historical times; the ancient Germans were the only barbarians known to Tacitus who were content with a single wife; and even in the East polygamy has been ascribed to merchants and artisans. In China there is but one rightful wife in a household, though a man may, if he will, keep secondary wives or concubines.

In Christian countries, even in those where concubinage and adultery are lightly regarded and divorce very easily obtained, polygamy is dealt with as a criminal offence. In Britain and the United States Bigamy (q.v.) is severely punished; under the same head any polygamous union is included. Nevertheless there have occasionally been found divines to defend polygamy or something like it. The Anabaptists insisted on such freedom; Oehino (q.v.) wrote in defence of it. When in 1540 Philip the Magnanimous, the reforming landgrave of Hesse, resolved with the consent of his wife (then a confirmed invalid) to marry a second wife, Luther and Melanchthon approved the transaction; personal freedom through non-conformity were the doctors of theology; and Bucer (q.v.) promoted, approved, and witnessed the bigamous union. The first wife survived the second marriage for nine years. As late as 1667, when Catherine of Braganza miscarried, some Anglican divines suggested polygamy as the best way of securing a direct heir to the throne.

Morganatic Marriage (q.v.) and Handfasting (q.v.) greatly simplified divorce, and often preceded a more binding and legitimate union; but another union at the same time was not compatible with either. In 1780 the Rev. Martin Madan, chaplain to the Lock Hospital in London, started the world and raised a violent controversy by arguing in favour of polygamy as a means of diminishing prostitution and saving human souls from guilt; the work in which these views were advocated was called The New Cornhill, or a Treatise on Female Ruin (3 vols. 1789–81). In recent times the Mormons (q.v.) by their practice of polygamy created a troublesome question for the administrators of United States law; but in 1890 they agreed to cease from making plural marriages. It has always been a disgust to the missionaries when conversions were made with several wives desired but not. As a rule the convert was treated as married only to the first wife in point of date, and was required absolutely to put away all the others—a rule that was inevitably harsh and inequitable in its operation. Bishop Colenso determined to make the convert part from wives he had married in good faith; so did the American missionaries in Burmah; and M'Farlane, in Among the Cannibals in New Guinea (1888), says that he and the other missionaries of the London Missionary Society 'resolved not to interfere with such social relations in which the gospel had found the people of New Guinea.' See Anthropology, Family, Marriage, Harem, and the works cited there.

Polyglot (Gr. poly, 'many,' and glotta, 'tongue') means a collection of versions in different languages of the same work, but is almost exclusively used in reference to the Greek Bible. The Hexapla of Origen (q.v.) contained, besides the Greek text, several other Greek versions, but is not commonly reckoned among the polyglots. The most famous polyglots are (1) the Complutensian, published under the patronage of Cardinal, nail-; (2) the Antwerp Polyglot, printed at the Plantin press, at the cost of Philip II, of Spain, in 1569–72, edited by Arias Montanus; (3) the London Polyglot, edited by Le Jay in 1645, in 6 splendid volumes; and (4) the London Polyglot, edited by Brian Walton, in 6 vols. folio, 1654–57, and containing the Bible, or parts of it, in nine languages. Of modern works of this kind the most convenient is Bagster's Polyglot, published a successful number at London in 1831 (new eds. 1874, &c.), which gives the Old Testament in eight languages (Hebrew, Greek, Latin, English, German, Italian, French, and Spanish), and the New Testament in nine (the Syriac version being added).

Polygnotus, a Greek painter who flourished in the middle of the 6th century B.C., was born in the isle of Theseus, and belonged to a family of painters. He was a friend of the Athenian general Cinon, and is said to have been attached to his sister, Elpinice. His principal works were at Athens, at Delphi, and at Pterae. In the first-named city he executed paintings in the temple of Theseus; in the Stea Pokiele (or Painted Portico), the Greek Princes assembled to judge of the Violation of Cassandra by Ajax; in the temple of the Dioscuri, the Rape of the Daughters of Leucippos; and in the Propylean on the Acropolis, a series from the old Greek legends. At Pterae he is stated, in the temple of the Athena, Ulysses and the Slain Suitors of Penelope. His greatest work is said to have been in the Lesche, a court or peristyile at Delphi, built by the Cnidians, the walk of which he covered with a series representing the Wars of Troy and the Visit of Ulysses to the Goddesses, or the Return of Ulysses to Polygnotus was a great advance on any of his predecessors. He was the first who gave life, character, and expression to painting. Aristotle extols the dignity and beauty of his conceptions.

Polygon (Gr. poly, 'many,' gonia, 'corner'), a plane figure, bounded by a number of straight lines; it is convenient to consider plane figures whose bounding straight lines are more than four in number. Polygons of 5, 6, 7, 8, &c. sides are denominated pentagons, hexagons, heptagons, octagons, &c.; and when the number of sides exceeds twelve the figure is merely mentioned as a polygon of so many sides.

Polygonaceae, a natural order of plants, mostly herbs, including a few shrubs. The leaves are alternate, with stipules cohering around the stem, though sometimes reduced to a mere ring. The flowers are not infrequently unisexual; the fruit generally a nut, often triangular, the seed with several pericarpaceous albumens which have an economic importance in buckwheat. The genus Polygonum comprises numerous species, of which several are natives of Britain; in North America
twenty-five species are found east of the Missis-
sippi. Knot-grass (P. aviculare) is a very common
British weed, and is found in cultivated and waste
places in all parts of the world from the tropics to the
Arctic regions. The stems of *P. amphibium*, an inhabi-
tant of ponds and watery ditches all over
England, are used by the fisherman for angling. The Spotted Persiania (P. persicaria), a very common
weed on ditches and in waste places in Britain;
but the only species really important on this
account is that called Dyer's Buckwheat (*P. 
tinctorum*), a native of China, the cultivation of
which has been successfully introduced in France
and Flanders. It yields a blue dye scarcely inferior
to indigo. *P. orientale* has long been occasionally
cultivated in flower-gardens in Britain, and is
quite hardy, although a native of the West Indies.
The Bistort (q.v.) belongs to the genus. *Fagopyrum*
was cultivated for buckwheat, abundant
on the mountains of the north of India, affords
an excellent substitute for spinach. *Fagopyrum
exsultans*, or *Polygynum Fagopyrum* (Buck-
wheat), is cultivated for the sake of its fruit, which
fits with its name. The Buckwheat is found in
northern Europe. The Garden Sorrel (*Rumex
acclusa*) and some other species of Runnex have a
singular combination of properties in their roots
and in their leaves. In the former there is greater
or less astringency, due to the presence of tannic
and gallic acid; in the latter, used in dye
less acida-
lous, owing to their containing oxalic acid. Rumbarb
(q.v.) belongs to this natural order; so does the Dock
(q.v.). The root of *Pterococcus aphyllo*, a native of the
sandy steppes of Siberia, when cut exudes a clear
viscid gum similar to Tragacanth (q.v.), which
swells in water and forms a mass of a bright
yellow colour; it is eaten by the Kalmucks in
times of scarcity. Its fruit, which is acid, is eaten
to quench thirst. *Trifaria americana* and *T.
Bomplandiana*, both natives of South America, are
sometimes grown as ornamentals, and are called
Admiralty. It produces racemes of fruit somewhat resembling
grapes or currants, the nut being invested with the
large and fleshy segments of the calyx. The fruit
is sweetish and subacid, and is used for tarts.
Coccoboa wifera is the Seaside Grape (q.v.) of the
West Indies. See also CALLITOXUM.

**Polynhymnia**, one of the nine Muses (q.v.).

**Polymerism.** See ISOMERISM.

**Polynesia** (Gr. *poly*, 'many', *nēos*, 'island'),
a term applied collectively by some writers to all
the Pacific islands of strictly oceanic character—i.e.,
either of volcanic or coralline origin; by others
restricted to the eastern groups inhabited by the
brown Polynesian race. Here it will be taken in
the broader sense so as to include all the Pacific
islands, except the Phylvan, New Guinea, and
Australia, except Japan, the Kuriles, Alentians,
Queen Charlotte, Vancouver, Revillagigedo, and
Galapagos, which are geographical dependencies of
the surrounding Asiatic and American continents.
The term in the narrower sense, or *South
Polynesian* as they are also called, are distributed over a vast space,
stretching across a hundred degrees of longitude
from New Britain (140° E.) to Easter Island (109°
W.), and across seventy degrees of latitude from
Hawaii (22° N.) to Stewart Island at the southern
extremity of New Zealand (47° 20' S.). But the
aggregate extent of dry land in this boundless
expanse of some 11 million square miles scarcely
exceeds 170,000 sq. m., of which nearly two-thirds
are in the South Pacific Archipelago, and the rest
in the total population is probably less than
1,500,000. See the map at World, and also
the physical map at Australia.

Polynesia comprises the three broad divisions of Micronesia, Melanesia, and East Polynesia,
which are distinguished by their geographical position, and partly by ethnological conditions,
and each of which is again subdivided into several
secondary groups. Thus, Micronesia (*Gr. mikros*,
'small', *nēos*, 'island') lies in the extreme north-
west almost entirely north of the equator, and con-
forms exclusively of small volcanoes and atolls,
forming the five archipelagoes of the Marianas
(Ludrones), Pelew, (Palaoa), Carolines, Marshall,
and Gilbert, all inhabited by heterogeneous popula-
tions in which most of the oceanic and perhaps
some of the continental elements are represented.
So also Melanesia (*Gr. melanos*, 'black') lies in
the extreme west entirely south of the equator,
and consists mainly of comparatively large upraised
crystalline, coralline, and volcanic islands disposed
in parallel chains from north-west to south-east,
forming the following divisions: 1. The Fijian,
Bismarck (New Britain and New Ireland),
D'Entrecasteaux, Louisiade, Solomon, Santa Cruz,
Banks, New Hebrides, New Caledonia, Loyalty,
and Fiji, all inhabited by the Melanesian or dark
Oceanic race. Lastly, East Polynesia lies on both
sides of the equator, mainly east of a line drawn
from New Zealand between Fiji and Samoa to
Hawaii, and consists of the twelve volcanic and
coralline archipelagoes of Hawaii (Sandwich),
Phoenix, Elice, Tokelau, Sanoa, Tonga, Ker-
madec, Austral (Taluna), Cook, Tahiti, Tuamotu
(Parimau), and Marquesas. Besides the large sedimentary and igneous region of New Zealand
and numerous sporadic islets, such as Norfolk,
Chatham, Rapaki, Easter, Manihiki, Tongareva,
Uvea, and many others. This division is the
most richly and variously peopled, and by recent white
migrants, of the large brown race, commonly called
'Polynesians' in a special sense.

Subjoined is a table of these multitudinous
island groups, with their areas, populations,
and political status.

<table>
<thead>
<tr>
<th>Island Group</th>
<th>Area in sq. m.</th>
<th>Pop.</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. MICRONESIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mariana</td>
<td>450</td>
<td>10,000</td>
<td>Germany and U.S.</td>
</tr>
<tr>
<td>Pelew</td>
<td>250</td>
<td>15,000</td>
<td></td>
</tr>
<tr>
<td>Caroline</td>
<td>400</td>
<td>30,000</td>
<td>Germany</td>
</tr>
<tr>
<td>Marshall</td>
<td>350</td>
<td>10,000</td>
<td>Germany</td>
</tr>
<tr>
<td>Gilbert (Ringnudi)</td>
<td>170</td>
<td></td>
<td>England</td>
</tr>
<tr>
<td>II. MELANESIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admatlity</td>
<td>770</td>
<td>5,000</td>
<td>Germany</td>
</tr>
<tr>
<td>Bismarck</td>
<td>16,000</td>
<td>70,000</td>
<td>Germany</td>
</tr>
<tr>
<td>D'Entrecasteaux</td>
<td>1,100</td>
<td>1,000 (1)</td>
<td>England</td>
</tr>
<tr>
<td>Louisiade</td>
<td>870</td>
<td>20,000</td>
<td>England</td>
</tr>
<tr>
<td>Solomon</td>
<td>16,300</td>
<td>175,000</td>
<td>England and Ger.</td>
</tr>
<tr>
<td>Santa Cruz</td>
<td>6,300</td>
<td>5,000</td>
<td>England</td>
</tr>
<tr>
<td>Banks</td>
<td>100</td>
<td>10,000</td>
<td>England</td>
</tr>
<tr>
<td>New Hebrides</td>
<td>5,000</td>
<td>62,000</td>
<td>Independent</td>
</tr>
<tr>
<td>New Caledonia</td>
<td>6,500</td>
<td>40,000</td>
<td>France</td>
</tr>
<tr>
<td>Loyalty</td>
<td>3,500</td>
<td>20,000</td>
<td>France</td>
</tr>
<tr>
<td>Fiji</td>
<td>8,000</td>
<td>12,500</td>
<td>England</td>
</tr>
<tr>
<td>III. EAST POLYNESIA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hawaii</td>
<td>6,700</td>
<td>81,000</td>
<td>United States</td>
</tr>
<tr>
<td>Phoenix</td>
<td>15</td>
<td>60</td>
<td>Independent</td>
</tr>
<tr>
<td>Elice</td>
<td>11</td>
<td>2,000</td>
<td>England</td>
</tr>
<tr>
<td>Tokelau</td>
<td>12</td>
<td>5,000</td>
<td>England</td>
</tr>
<tr>
<td>Sanoa</td>
<td>1,000</td>
<td>35,000</td>
<td>U.S. and Germany</td>
</tr>
<tr>
<td>Tonga</td>
<td>450</td>
<td>40,000</td>
<td>England</td>
</tr>
<tr>
<td>Marquesas</td>
<td>40</td>
<td>10,000</td>
<td>England</td>
</tr>
<tr>
<td>Austral</td>
<td>295</td>
<td>1,000</td>
<td>France</td>
</tr>
<tr>
<td>Tahiti (Society)</td>
<td>600</td>
<td>17,000</td>
<td>France</td>
</tr>
<tr>
<td>Tuamotua (Low)</td>
<td>389</td>
<td>1,000</td>
<td>France</td>
</tr>
<tr>
<td>Marquesas</td>
<td>480</td>
<td>6,000</td>
<td>France</td>
</tr>
<tr>
<td>New Zealand</td>
<td>101,000</td>
<td>604,000</td>
<td></td>
</tr>
</tbody>
</table>
POLYNESIA

Lying almost entirely within the tropics, and consisting nearly everywhere of igneous or coraline groups exposed to the same atmospheric and marine currents, Polynesia presents great uniformity in its climatic and biological conditions. In these respects, however, New Zealand belongs to a separate world, thanks to its large extent, lofty ranges, different geological history, and high southern latitude. But even in Fiji, Tahiti, Samoa, the Solomon and Hawaiian groups, with volcanic cones ranging from 1000 to nearly 14,000 feet, less variety is presented by the different local floras than might be expected from their great altitudes, compared with the prevailing world trade winds which are the moist south-east trades, which in summer veer round to the west and north-west. But these winds also bring moisture-bearing clouds, so that the rainfall is generally high, in the Solomon's excessive (150 inches), in Hawaii 60 to 80, and in New Caledonia over 40. But many of the atolls, being too low to arrest the currents, receive very little moisture, and in some places constitute a rainless zone, as indicated by the accumulated deposits of guano. The mean temperature is about 70° F. both in Hawaii and New Caledonia (about the same as on the equator from 5° S. to 10° N. to 90° F. But the climate, except in New Caledonia and New Zealand, is everywhere relaxing, and in the Solomons and other large islands malarias up to considerable altitudes.

In the coraline groups the flora is essentially oceanic, the prevailing species being the cocoa-nut and one or two other palms, the pandanus and bread-fruit tree, and such edible roots as yams, taro, and sweet potatoes. Besides these forms, the large archipelagoes have a rich forest vegetation, mostly belonging to the Papuanian and Australian zones, with some American and Pacific elements. Hence the prevalence of casuarinas, drimmaras, araucarias, tree-ferns, besides myrtles, ebony, and the banyan fig. Highly specialised forms are the New Caledonian niaudi (Melaleuca lanceolata), which yields the cajetut-oil, and the Hawaiian olenhons kula and gigantic kulaepo (Branch.)

In contrast with the relatively rich flora is the remarkably scanty fauna. The dog and pig were found both in the Solomons and Hawaii at the time of their discovery; but both appear to have been introduced in comparatively recent times. The only undoubtedly indigenous mammals in these and the other Polynesian groups are two or three species of rodents (rats and mice) and a few varieties of the bat family. Even reptiles and insects are rare, being chiefly represented by three small lizards in Hawaii, one snake, one scorpion, one centipede, and a spider in New Caledonia, a few snakes and frogs in Fiji, and in Hawaii a few snakes, one centipede. Fiji is the easternmost limit of the frog and the Solomons of the crocodile, which here adapts itself both to fresh and salt water about the rivers and estuaries. Birds are everywhere more numerous, 107 species occurring in New Caledonia, 46 in Hawaii, 30 in the Carolines, generally only ten in Tahiti. The 80 (Moho nobiltis), whose lovely black and yellow plumage is used for decorating royal mantles.

In recent times no branch of ethnology has been more carefully studied than that which deals with the origin, migrations, physical features, languages, and customs of these islands, and the intricate are their mutual relations that the difficult anthropological and linguistic problems suggested by a comparative study of these peoples are still far from solved. There is, however, a general consensus that Polynesia has been occupied from prehistoric times by two distinct races, the dark Melanesians, who belong to the same stock as the Papuans of New Guinea and Malaysia, and the brown Polynesians, called also Mahor and Savaior, whose racial affinities have not been satisfactorily determined. By different writers they have been classed to the Mongolian, Malays to the Aryans, Caucausians, to the American aborigines, and even to the Melanesians. But the difference between the Polynesians and Melanesians must be regarded as fundamental. The former are brachycephalians (round-headed, with high cephalic index), orthocephalians (with a flat head), dolichocephalians (long-headed, with the lowest cephalic index of any race), prognathous, broad-nosed, of a sooty black colour, with low orbits, black frizzly hair, and low stature (mean height, 5 feet 5 inches). The Melanesians are dolicocephalians (long-headed, with the lowest cephalic index of any race), prognathous, broad-nosed, of a sooty black colour, with low orbits, black frizzly hair, and low stature (mean height, 5 feet 5 inches).

The Polynesians, who closely resemble the Indonesians of the Malay Archipelago (see MALAYS), seem to be later arrivals almost certainly from Malaysia to Samoa, whence they gradually spread from island to island in a series of migrations. After the Polynesians, more recently sending colonies westwards to Melanesia and even to New Guinea. Hence Savaior settlements and mixed Savaior-Melanesian communities are now found in the eastern parts of Fiji, in the New Hebrides (Ninot, Fatuna, Mel, and Fili), in the Loyalty group (Uvea), in British New Guinea (Motu), and generally in Micronesia. That Samoa was the centre of dispersion is shown by the recurrence of such geographical terms as Samoan and Savaii (originally Savai), the largest island of the archipelago, under a title of common use, and the American Hawaii, Haivaiki, Haivaiki, Aivaiki), either in the geographical nomenclature or in the traditions and mythologies of all the Polynesian islands from New Zealand to Hawaii.

In Easter Island (Rapanui) and the Carolines (Ponape, Lele, Ualan) are found many cyclical monuments, with monolithic pedestals, stone avenues, ramparts or walls of basalt blocks over 30 feet long, brought from great distances. None of the present races could erect such structures as these, all memory of which has died out. They have been erected in the same way by the ancient peoples of America, and the features of the Easter Island (q.v.) statues are said to resemble the Balivan Aymarans, though others have recognised a Papuan cast in the specimens preserved in the British Museum. Skulls of a Papuan type have been found in the Carolines, and in the Tahitians the monuments were erected by these natives, it must have been under the direction of builders such as the Hindu missionaries who raised the stupendous temples of Java and Indo-China by training Mahay and Cambodian craftsmen for the work. The Polynesian languages appear to be members of the great Malayo-Polynesian family, which stretches across two oceans, from Madagascar to Rapanui. However it is to be explained, the fact is now established that both the dark and
brown peoples speak idioms derived from a common stock; and Mr. Colrington has even shown that the Melanesian are of a more archaic type than the Polynesian tongues. Perhaps this is the most inexplicable of all the problems presented by the Oceanic peoples, for here anthropology and philology are found to be in direct antagonism. An air of mystery appears as the theory has imposed its speech on the higher race, by whom it became profoundly modified both in its phonetic system and grammatical structure. But the reverse and less violent process is conceivable, and it may be seen in the blending of their own migrations over the Pacific that the more surprising fact that the intelligent Polynesians transmitted their speech to the more passive Melanesians at a very remote period, the former afterwards modifying it in the direction of greater simplicity and harmony, the latter preserving it in its more pristine inflectional form.

For over a century the Oceanic peoples have been in contact with Europeans, and nearly all the Polynesians, as well as many of the Melanesians, profess some form of Christianity—the first mission established by the Society Church was in 1797 (Cook's visit)—but the history of that Mission is left in the hands of the London Missionary Society. But as western influences increase the races themselves appear to decrease. Thus, the population of Hawaii had fallen from about 300,000 at the time of Cook's visit (1778) to 40,000 in 1854; the Maoris of New Zealand, from 400,000 in 1769 (Cook's first visit), were reduced to 42,000, including half-castes, in 1886, and the Tahitians from 240,000 in 1776 to less than 10,000 in 1888. Here and there the returns show an apparent increase, as in some of the Ellice and Marshall islands, but these are half-castes. Everywhere the pure Polynesian race seems to be rapidly disappearing, a phenomenon attributed partly to the introduction of alcoholic drinks, partly to the abrupt change of habits, dress, diet, &c. enforced or encouraged by the missionaries, but mainly to the ravages of leprosy, smallpox, syphilis, measles, and especially pulmonary affections, by which whole communities have been decimated.

Formerly the political organisation was based on a distinction between two classes, the nobles and the commoners. The Maoris of New Zealand have a system of democracy; but elsewhere the archipelagoes constituted one or more monarchies of a somewhat feudal character, with powerful hereditary rulers under a king, whose authority had been much reduced in Samoa, the Marquesas, and the other islands. Their subjects were gay, pleasure-loving people, engaged chiefly in fishing, agriculture, and navigation. Their diet was largely vegetarian (yams, taro, bananas, cocoa-nuts, &c.), varied with fish, pork, poultry, and, in some places, human flesh. Human victims were also offered on solemn occasions, and a prominent feature of the primitive religion was the so-called Tabu (q.v.), in virtue of which certain persons and objects acquired a sacred character. But there was nowhere a distinct sacerdotal class, and most of the old beliefs had resolved themselves into a system of ancestor-worship. Other distinctive institutions were certain orders of knighthood, secret societies with peculiar semi-religious rites, and tattooing, which, especially in Micronesia, acquired the character of a fine art and resulted in systems of Japanese systems in its elaborate designs and skilful execution. Few other arts were practised, and letters were unknown, although a national folklore, tolerably rich in historic legends and myths, was orally preserved, and has now been mainly recorded by scholars and missionaries. See CORAL, and the articles on the several Polynesian islands or groups of islands; and for the first navigators in Polynesia, see GEOGRAPHY, PACIFIC OCEAN.

See POLYPHYTA, PACIFIC OCEAN in this work. See also ELLIOTT, Polynesian Mythology (1855); De Quatrefages, Les Polynesiens et leurs Migrations (1866); Pritchard, Polynesian Dilemmainscences (1886); Angas, Polynesian Races of the Pacific, &c. (1867); Wautz-Gerland, Anthropologie der Naturvölker, vol. vi. (1872); Morebly, New Guinea and Polynesia (1877); Fornander, An Account of the Polynesian Races, &c. (1878); (1879); Historical Sketches of Savage Life in Polynesia (1880); Lesson, Les Polynesiens, &c. (1880-87); Keane, Tatau-Oceanic Races and Languages (1880); Novaera and Challenger Reports, TheMarquesas (1891) and Guillemand on Malaysia and the Pacific Archipelagos (1891) in the new edition of 'Stanford's Compendium.'

Polyn., a name usually applied to an animal like the fresh-water Hydra or like the Sea-anemone, having a tubular body and a wreath of many tentacles around the mouth. The name is equally applicable to an isolated individual or to a member (zoon or person') of a colony. Thus, the individuals which make up a zoophyte or a coral colony are called polyps, and the term is seldom used except in reference to Cenolateral animals. But the Greek and Latin work on natural history the term polygon or polygonus is usually applied to the octopus (poulpe), or some other cuttle-fish, though sometimes to the many-footed wood-locust, Ommus. Réanemur and Jussieu were the first to apply the word to zoophytes and the like; Lamarck used it more loosely, but gradually it has been narrowed to the signification above noted. See ANEMONE, CENOLATERA, CORAL, HYDRA, HYDROZOA, &c.; and POLYPUS, for the surgical use of the term.
Polyporus. See Amadou, and Dry Rot.

Polyporus, a genus of Ganoid fishes, of which only one species (P. bicirri) is known. It lives in the Nile and western rivers of tropical Africa. It may attain a length of 4 feet, and is esteemed as food. Very characteristic is a series of dorsal spines, with attached fillets, which extend almost the entire length of the back. Of its life very little is known. The only nearly allied living form is Coleochothys calabaricus from Old Calabar.

Polypus, in Surgery, is an ancient term employed to signify any sort of pedunculated tumour attached to the surface of a mucous membrane, to which it was supposed to adhere like a many-footed animal, as its name indicates. The most common seats of polypus are the nostrils and the uteri; but these tumours are also found in the rectum, the larynx, and the external auditory passage of the ear. The only satisfactory mode of treatment consists in their removal, which must be effected in various ways, according to their position, as by the forceps, écrasément, ligature, &c.

Polytechnique, or Polytechnic School (Gr. polye, 'many'; techné, 'art'), is an institute in which the technical sciences that rest in great part upon a mathematical basis, such as engineering, architecture, &c., are taught. The first school of the kind was established in Paris (1794) by the National Convention, under the name of School of Public Works. No students were admitted but those who intended to enter the public service, especially the corps of civil and military engineers and the artillery. The Polytechnic School, as it was called from 1795, has been repeatedly reorganised as the different political parties have succeeded to power. At the present time it is the Institute in which France trains her artillery and engineer officers, her naval engineers, her directors of roads and bridges, and of mines, her telegraph officers, in short, all her officials who require to know something of the higher branches of technical science. Germany too has her polytechnics. Those that came into being during the first half of the 19th century were in great part training-schools for the higher branches of the industrial arts; but since Zurich established (1855) a polytechnic modelled on the plan of the German universities, most of the German polytechnics have followed suit. Of these establishments, thus increased in scope (now called also Technische Hochschulen), Germany has nine or ten, and Austria-Hungary half a dozen; though Germany has also several other colleges which might fairly claim the name of Polytechnicum in the old sense. In the U.S. in America the oldest institutions of the kind are the Rensselaer Polytechnic Institute, at Troy, New York, and the Franklin Institute, at Philadelphia, both founded in 1824. There are now nearly a hundred technical schools in the United States, more than half of which were endowed with a national land-grant. See Technical Education; also Art; and Pinti, Histoire de l'Ecole Polytechnique (1886).

Polytheism. See Religion.

Polytrichum, a genus of Mosses (q.v.).

Polynya, or Brizozoa, a class of small animals which, with one exception, form colonies, and are almost always fixed. Most familiar are the sea-mats or horn-wrackes (Phustra), east-up pieces of which are sometimes found on the beach. On these will be seen the hundreds of separate chambers in which the minute individuals live. Each individual has a sac-like or cup-shaped body, traversed by a food-channel bent like a U, crowned around the mouth by a wreath of tentacles, controlled by a single nerve-centre. The cuticle which surrounds the body is usually horn-like, not so much asyndetic as gelatinous (Cellepora, Lepaila, &c.), and sometimes gelatinous (Alcyonidium, Lophosporium). The individuals of a colony are not always all alike; thus, some of them are occasionally modified into strange bird's-beak-like or whip-like structures. All Polynya multiply by budding, and thus the colonies increase. The individuals in the older parts of the colony usually degenerate or die. Fresh-water forms reproduce by peculiar winter-buds or statoblasts, which are liberated on the death of the parent, are floated away by currents, and after some months' quiescence develop into young buds. But all Polynya also reproduce sexually; the sexes may be separate or united; the larvae developed from the eggs are free-swimming. The Polynya used to be ranked with zoophytes (among the Hydrozoa), but the individual animals are much more complex and are independent of one another. Often they are called mulluscoids, because of apparent affinities with lamp-shells or Brachiopods, which used to be regarded as allied to molluscs. Most modern zoologists rank them as a distinct class, the Brachiozoa, in the great assemblage of 'worms' or 'Vermes.' Representative genera are Cristatella, Lophosporium, Pluma- tella—in fresh water; Flustra, Membraniporium, Alcyonidium, Cellepora—marine; Pedicellina and Loxosponia—two marine genera, simpler than the others, the latter non-colonial. R. hudsonia, a remarkable genus sometimes included in this class, shows at least hints of vertebrate affinities.

See Allman, British Fresh-water Polynya (Lond. 1886); Buck, Challenger Report, X. (1884); Hincks, British Marine Polynya (Lond. 1880); E. Ray Lankester, article 'Polynya' in Brit. Encyclopædia.

Pomacea, or Pomer, according to some botanists, a natural order of plants, but more generally regarded as a sub-order of Rosaceae (q.v.). The plants of this order are all trees or shrubs, abundant in Europe, and chiefly belong to the
temperate and colder regions of the northern hemisphere; they are rare in very warm climates, and are not found at all in the southern hemisphere. They have the botanical characters described in the article Rosaceae (q.v.), and in addition are distinguished by having the pericarp usually referred to as the teasel, the very fleshy and juicy, lined with a thin disc, its carpels adhering more or less to the sides of the calyx and to each other; the fruit a \textit{Pome} (q.v.), 1- to 5-lobed, in a few instances spuriously 10-lobed; the ovules in pairs, collateral. Many of the species are prized for the beauty and fragrance of their flowers, some produce valuable timber; but the order is chiefly remarkable as producing a number of the very finest fruits of temperate climates. See \textit{Apple}, \textit{Pear}, \textit{Quince}, \textit{Medlar}, \textit{Loquat}, \textit{Hawthorn}, \textit{Crataegus}, \textit{American Chokecherry}, \textit{Rowan Tree}, \textit{Service}.—There are about 200 known species.

\textbf{Pomade}, or \textit{Pomatium}, is a preparation of fine inodorous fat, such as lard or suet, used instead of liquid oil for the hair. It may be perfumed with various essences.

\textbf{Pombal}, Sebastião José de Carvalho e Melo, marquis of, the greatest of Portuguese statesmen, was born 18th May 1699, at the castle of Soure, near Coimbra. In 1739 he was appointed ambassador in London, and six years later was sent to Vienna in a similar capacity. Just before Joseph I. ascended the throne of Portugal (1750), Pombal was appointed secretary for foreign affairs. He was afterwards re-appointed to the crown a number of domains that had been unjustly alienated. When the great earthquake happened at Lisbon in 1755 Pombal displayed great calmness and fertile resources, so that next year the king made him prime minister. He crushed a revolt instigated by the great nobles and the Jesuits, and in 1756 abolished the latter from the kingdom. Then he abolished slavery in Portugal, set himself to establish good elementary schools, and published a new code of laws. Besides this, he effected the reorganisation of the army, the introduction of fresh colonists into the Portuguese settlements, the establishment of an East India Company, and another for Brazil. The tyranny of the Inquisition was broken. Agriculture, commerce, and the finances were all improved. In 1758 he had been made Count of Oeiras, and in 1759 became the marquis of Pombal. On the accession of Joseph's daughter, Maria I. (1777), who was under clerical influence, Pombal, who had himself been high-handed, if not despotic, especially towards the Church, was banished from court, while many of his institutions were abolished. He died at his castle of Pombal, 8th May 1782.


\textbf{Pome} (Lat. \textit{pomum}, 'apple'), the form of Fruit (q.v.), produced by the \textit{Pomaceae} (q.v.)—a fleshy, indehiscent, syncarpous fruit, with calyx attached.\n
\textbf{Pomegranate} (\textit{Punica granatum}), a fruit much cultivated in warm countries, and apparently a native of the warmer temperate parts of Asia, perhaps also of the north of Africa. It has been cultivated in Asia from the most ancient times, and is mentioned in the Old Testament. It has long been naturalised in the south of Europe. In a wild state the plant is a thorny bush, and in cultivation it is a low tree, with twiggy branches, flowers at the extremities of the branches, the calyx red, the natural astringent to the natural astringent. It is a medium-sized orange, having a thick leathery rind of a fine golden yellow, with a rosy tinge on the sunny side, not bursting when ripe; the cells filled with numerous seeds, each of which is surrounded with pulp, and separately enclosed in a thin membrane; the upper and lower series of carpels being differently attached. Thus the pomegranate appears to be formed of a great number of reddish berries packed together and compressed into irregular angular forms. The pulp is sweet, sometimes subacid, and of a pleasant delicate flavour, very cooling, and particularly grateful in warm climates. It is often used as a substitute for the preparation of cooling drinks. A kind of pomegranate without seeds is cultivated and much prized in India and Persia. Pomegranates have long been imported in small quantities into Britain from Portugal and the north of Africa, but have never become an article of general demand and commercial importance like oranges. There is an ornamental variety of the pomegranate with double flowers. The rind of the fruit is very astringent, and a decoction is used as a gargle in relaxed sore throat, and as a medicine in diarrhoea, dysentery, &c. Deriving its astringency from tannin, it is used to tan leather. The finest Moroccan leather is said to be tanned with it, and small quantities are imported into Britain from the north of Africa for the preparation of the finest kinds of leather, under the name of \textit{Pomacrate Bark}. The bark of the roots is used as an anthelmintic, and is often successfully administered in cases of tapeworm. It contains a peculiar principle called \textit{punigen}, having the appearance of an oleo-resin, an astringent taste, and affecting the parasite (\textit{Vermiculus Calci})—its value was known to the ancients, and it has long been in use in India. The pomegranate tree is occasionally cultivated in hothouses or greenhouses in Britain. It bears the winters of the latitude of London in the open air, and is very ornamental, but the fruit is worthless. In some parts of the south of Europe it is used as a hedge-plant. In northern Mexico it grows to great perfection, and in some of the southern states of the American Union; even as far north as New York it will, if protected in winter, bear fruit, and in some seasons ripen it.

\textbf{Pomerania} (Ger. \textit{Pommern}), a province of Prussia, bounded N. by the Baltic, E. by West Prussia, S. by Brandenburg, and W. by Mecklenburg. Area, 11,620 sq. m. It is one of the lowest and flattest regions in Germany, and has few hills of even moderate height, but many small lakes and ponds. The river Oder divides Hither Pomerania (next Mecklenburg) from Further Pomerania. The shores of the latter are lined with sand-dunes. The islands of Wollin and Usedom form the northern side of the Stettiner Haff (Lagoon); and farther to the north-west lies the island of Rugen. Pomerania is essentially an agricultural province, more than 55 per cent. of the total area being in tillage, whilst meadows cover another 19 per
cent, and forests nearly 29 per cent. Rye and potatoes are the principal products; in a secondary degree come wheat, barley, oats, flax, beet-root, tobacco, hops, and fruit. More than 55 per cent. of the soil is owned by the nobility, as in Mecklenburg (q.v.). Commerce flourishes in the coast towns, Stettin and Stralsund being the most important. Apart from shipbuilding, machine-working in the metals, manufacture of sugar, chemicals, bricks, &c., which are carried on principally in the coast towns, the only industries are paper, tobacco, glass, and wooden wares. The fisheries are valuable. Much poultry is reared, especially geese, in Farther Pomerania. The coast of the Gulf of Bothnia is the heart of its university; Stettin is the capital.
Pomerania sends fourteen members to the imperial Diet, and twenty-six to the Prussian Lower House.

POMEROY

Pomeroy, capital of Meigs county, Ohio, between the Ohio River and a range of precipitous hills, 133 miles by rail SE. of Columbus. The quarrying of coal and the manufacture of salt are the chief industries. It also contains foundries, a woolen-factory, &c. Pop. (1880) 5560; (1900) 4639.

POMFRRET

Pomfret, See Pontefract.

POMONIA, the Roman divinity of the fruit (pomum) of trees. She was beloved by several of the rustic deities, as Sylvanus, Panns, and Vertumnus. Propertius tells us that the last, after vainly trying to approach her under various forms, at last succeeded by assuming the figure of an old woman. In this guise he recounted to her the lamentable histories of women who had despised love, and, having touched her heart to pity, suddenly transformed himself into a blooming youth. Varro tells us that at Rome the worship of Pomona was under the care of a special priest, the Flamen Pomonalis. In works of art she was generally represented with fruits in her lap, or in a basket, with a garland of fruits in her hair, and a pruning-knife in her right hand.

POMONA, or MAINLAND. See ORKNEY.

POMPADOUR, JEANNE ANTOINETTE POISSON, Ma mère, who provided for her education the magnificent treasuries of Louis XV., was born in Paris, 29th December 1721. She was baptised as the child of François Poisson and his wife Madeleine de la Motte, but it was suspected that her father was Le Normant de Tourneham, a wealthy fermier général. For five years she grew up a woman of remarkable grace and beauty, devoted to music and painting, and charming every one by her vivacity and wit. But her mind was early depraved by her mother, who constantly dinned into her ears that she was 'un moreau de ro,' and habituated her to see in the rôle of royalty the idea of female domination. In 1741 she was married to her protector's nephew, Le Normant d'Étioles, and soon became a queen of fashion in the financial world of Paris. But neither this nor a devoted husband's love could satisfy her heart, and, as it was impossible to hope for an introduction at court, for two years she sought to attract the eye of the king by waylaying him when he went out hunting. At length in February 1745 she attained her object at a ball given by the city on the occasion of the dauphin's nuptials, and ever long she was installed at Versailles, and courted by the Duke of Marigny and Maréchal de Pompadour. Her husband, to whom she had already borne a daughter, was removed from Paris, but later had his place recouped with lucrative offices; her brother was afterwards made Marquis de Marigny. Ever long she assumed the entire control of public affairs, the king being nearly an inconstant frondeur who assisted at the spectacle of his reign without even taking an interest in it. For twenty years the mistress swayed the whole policy of the state, and lavished its treasures on the gratification of her artistic tastes, and in carrying out her ambitious schemes. She brought the traditional policy of France because Frederick the Great lampooned her, and the proud Maria Theresa addressed her in a letter under the royal style as Ma maîtresse. She filled all public offices with her nominees, corresponded with the generals in the field, and made her own revolutions. She was a favorite of the arts, and heaped her bounty upon poets and painters, yet did not eschew showers of lampoons—the famous Poissardes, for a suspected share in which a wit went to the Bastile. She loved china, fine buildings, books, and sumptuous bindings, and it is said she kept at her hands a fine edition of the Redingue of Corneille. Indeed, she was an artist in everything—'elle était des mères,' as Voltaire said truly when he heard of her death. The king remained faithful to her from habit rather than affection, and from the rôle of mistress she retreated into the rôle of senior, and retained her difficult position to the end, by relieving him of all business, by diverting him with private theatricals in her famous 'théâtre des petits cabinets,' where she acted charmingly, and at last even by contravening his infamous débâcles and providing him with mistresses too insignificant to be rivals. She herself said with the pathos of truth, 'ma vie est un combat;' and at last her nerves gave way under the strain, and after a languor of twenty days she died, 15th April 1764. She met the inevitable with that queenly dignity that made everything she said the more muffled on the wings of a playful salut—'Stay, Monsieur Curé,' she said to the priest who was leaving her room, 'wait a little; we shall go out together.' Madame de Pompadour was the last mistress of the king worthy of the name; the descent from her is interrupted by a blank. The leniency of the North-agencies of Durbary was profound. She was 'froide comme une mèreuse,' says Madame du Hausset, her femme-de-chambre, in her silly but interesting memoirs, and there can be no doubt that throughout her lifetime ambition was the one passion of her heart. She secured this for herself and her son. When the sooner had she closed her eyes than she was forgotten.

The Mémoires (Liége, 1700) attributed to her are of no value. See the studies by Capefigue (1858) and Campardoun (1867): E. and J. de Goncourt, Les Mémoires de
Pompeii, a seaport at the mouth of the Sarnus, on the Neapolitan Riviera, founded about 600 B.C. by the Oscans, and, after them, occupied by the Tyrrheno-Pelagians, and by the Samnites, till these, about 80 B.C., were dispossessed by the Romans. From that time down to its destruction, 79 A.D., it became (with Herculaneum) a sort of Roman Pompeii, frequented by the aristocracy, if not by Caligula and Nero, in whose honour it erected triumphal arches. Fed from the capital with every luxury and distinction, it included temples in which the inhabitants were encouraged to make costly sacrifices with all their adjuncts of festivity and banqueting; indeed, its public monuments, out of all proportion to its size, were in number and magnificence such as we can now but dimly estimate. On February 5, 63 A.D., by an earthquake in the vicinity, these buildings were all but levelled with the ground, and some years elapsed ere the fugitive citizens recovered confidence enough to reoccupy and rebuild what was once Pompeii. Reconstruction was carried out with a waste and disregard of architectural law contrasting strongly with the earlier work—the Forum especially exhibiting the inferiority of its Roman to its Greek builders. Tawdri ness replaced simplicity of decoration—the columns, capitals, cornices, being ornamented with reliefs in stucco picked out with parti-coloured designs, while private houses, fantastically restored and adorned, infringed every artistic or aesthetic canon to favour the grotesque style of the Decadence. Reuniformised as it was for the worse, the city, however, retained a good deal of Greek character and colouring, and had relapsed into more than its former gaiety and licentiousness, when on the 23d August (or, more probably, on the 23d November) 79, with a return of the shocks of earthquake, Vesuvius was seen to throw up a column of black smoke expanding like some umbrella-pine of the neighbourhood, till it assumed the proportions of a great swarthy cloud, dense with ashes, pumice, and red-hot stones, settling down on the doomed cities with a force increased by the rain-torrents that intermittently fell. Amid the impenetrable gloom that veiled land and sea, the panic of the citizens was aggravated by repeated shocks of earthquake, and for three days the flight continued till Pompeii was abandoned by all who could effect their escape. By the fourth day the sun had partially reappeared, as if shining through a fog, and the more courageous of the citizens began to return for such of their property as they could disinter. Much was doubtless recovered or possibly stolen; but the desolation and distress were such that the reigning emperor Titus organised relief on an imperial scale, and even undertook the clearing and rebuilding of the city. This attempt was soon abandoned, and Pompeii remained a heap of hardened mud and ashes, gradually overgrown with grass—the wall of the great theatre and the outline of the amphitheatre alone marking its site—till 1592, when the architect Fontana, in cutting an aqueduct, came on some ancient buildings. These were long believed to mark the old Stabiae; and only in 1748, under the Bourbon Charles III., were they recognised as part of Pompeii. Unsystematic, unscientific excavations proceeded fitfully till 1860, when the Italian kingdom took in hand the unearthing of the city. This was carried out with admirable ingenuity, care, and success—all treasure-trove being vigilantly preserved, and an archaeological record kept by the official excavators Fiorelli and Ruggiero, till now Pompeii possesses a distinction unknown to it in the zenith of its imperial favour, and attracts the pilgrim from every clime for the object-lessons it is unique in affording as to the public and private life of antiquity.

We cannot give more than the merest indication of the outline and distribution of Pompeii as now exposed. In form an irregular ellipse, extending from east to west, in circumference about 2843 yards, it had eight gates to which archaeology has given names mostly conjectural. It had outgrown its walls, however, particularly towards the sea, and developed considerable suburbs. Its most important part—not quite one-half, including Forum, adjacent temples and public buildings, two theatres with colonnades, amphitheatre, and many private houses—has already been exhumed, and five main streets made out and (provisionally) named. It has been divided, by official arrangement, into nine regiones (quarters), seven of them wholly or partially excavated, and each is subdivided into insulae (blocks), bounded by four streets and provided each with a number, as are also the streets of each quarter. A trottoir borders the streets, which are straight and narrow—the broader 24 feet wide, the narrower 14 feet only—and admirably paved with polygonal blocks of lava. High stepping-stones, placed mostly at the corners, lead across from one trottoir to another, and these retain the impressions of horses' hoofs, while in the causeway between the wagons have left deep ruts. The street corners are provided with fountains, ornamented usually with the head of a god or a mask. Notices painted in red letters, and referring to municipal elections for which some particular candidate is recommended,
occur frequently on the street walls, while trade-signs are few and far between. An occasional 'phallus,' to avert the evil eye, projects from over a doorway, and, much more common, one or two large stone blocks, especially at the corners. These were two-storied, sometimes three-storied houses are numerous, though the upper floors, built of wood, have been consumed by the eruption. Shops usually occupied the ground floors of dwelling-houses, on their street aspect, let out to merchants or dealers as at the present day, but not connected with the back part of the house. They could be separated from the street by large wooden doors, while inside they had tables covered with marble, in which earthen vessels for wine or oil were inserted. The shopkeeper had sometimes a second room at the back of his shop, with a floor over another part of the town. Retail traffic must have been considerable at Pompeii, to judge from the number of those shops along the streets, which, when not so flanked, presented bare walls, occasionally enlivened with a painting. Only a person of some importance, or with an idea of trade, like the Pompeians, with whom the absence of glass, the fewness of the openings in the street aspect of the house-wall, and the protection of these with iron gratings are among the points noted by the most casual visitor. Models of the interior of an entire house in its entire length are given in the fuller guide-books to Pompeii—the feature that most strikes the northerner being the smallness of the rooms, particularly the dormitories—quite intelligible, however, when he realises that the Pompeians led an open-air life, and performed their toilets at the bath, public or private. As rebuilt after 63, Pompeii shows little marble, the columns being of tufa or brick cemented by mortar. A coating of stucco was laid over wall or column, and presented an ample field for ornamental painting. This must have given to Pompeii its bright, gay appearance, with the blues, greens, yellows, on column and capital, on wall and partition, harmonise so well with the glowing sunlight of the south. On the centre of the interior walls is generally seen a painting unconnected with the others—often of a nymph, or a genius, when not decorated erotic in theme, typifying faithfully a voluptuous sensuous life of this pleasure-haunt of paganism.

Thanks to photographs, to the excellent plans in the best guide-books, and to models, the reader, as the next best thing to a personal visit, can make a tour of the excavated portion of Pompeii, and, from the minute and trustworthy descriptions of the temples, basilicas, public buildings, and private houses, form a vivid realisation of the city in its most frequented and animated quarters. Here the phenomena which struck such a man as E. Neville Rolfe's 'Pompeii, Past and Present,' illustrated by photographs of the ruins as they are, with sketches of their original elevations (Lon. 1884). The student who wishes to enter fully into the whole subject should read Maizis, Les Ruines de Pompei (4 vols. Par. 1812-23); Nissen, Pompeian. Studien zur Städtekunde des Alterthums (Leip. 1877); Funck, Geschichte der dekorativen Wandmalerei (Hamb. 1882); and Th. Overbeck's Pompei (Leip. 1884); K. Lange, Haus und Hall (Leip. 1885); while Professor Fiorelli's great work, Gli Scavi di Pompei del 1861 al 1872, is a mine of information, supplied at first hand by the official excavator, and bearing witness to the immense ingenuity of the method by which, pouring in liquid plaster of Paris into the hollows occupied by the skeletons of the victims of the eruption, and allowing it to harden, he obtained a 'perfect cast, consisting of the bones of the deceased Roman citizen, clad no longer in flesh, but in plaster of Paris.

Pompeii, the rival of Caesar, was born in 106 B.C., and at seventeen fought along with his father in the Social or Italian war on the side of Sulla against the faction of Marius and Cinna. When Sulla returned from Greece to Italy to oppose Marius (84) Pompey hastened into Picenum, and there raised an army of three legions, with which he drove the soldiers of Marius out of the district, and then joined Sulla. For his prudence, valour, and good fortune throughout the civil wars he was awarded the Marian faction in Africa and Sicily. On his triumphant return to Rome he was honoured with the name of Magnus, or the Great. His triumph was an unprecedented distinction for one who had not yet held any public office and was merely an owner of a few estates, some 300 acres, outside Rome. With the followers of Lepidus, whom he drove out of Italy, and the extinction of the Marian party in Spain under the brave Sertorius (75-71), Pompey suffered some severe defeats from Sertorius, and, indeed, put an end to the war only after his assassination, but his successor, his adopted son, the agent of his political establishment, fell in with the remnant of the army of Spartacus, and thus closed the Servile war. He was now the idol of the people, and, though legally ineligible for the consulship, was elected for the year 76, the senate relieving him of his disabilities rather than provoke him to extremities. Hitherto Pompey had belonged to the aristocratic party, but of late years he had been looked upon with suspicion by some of the leading men, and he now publicly exposed the people's cause. He carried a law restoring the tribunial power to the people; and sided largely in introducing the Lex Aurelia, by which the judicatores should for the future be taken from the senate, the equites, and the tribuni curiae, instead of from the senate alone. In 67-66 Pompey cleared the Mediterranean of the pirates who infested it; and during the next four years (65-62) conquered Mithridates, king of Pontus, Tigranes, king of Armenia, and Antiochus, king of Syria. At the same time he subdued the Jews and captured Jerusalem. On his return to Italy he disbanded his army, and entered Rome in triumph for the third time in 61. But now his star began to wane, as before. He had the two Julia died in 54, and thus father-in-law and son-in-law were
Pompey's Pillar

Poniatowski

sundered by a yet wider gulf, which no bridge could span. Pompey now returned to the aristocratic party, whose great desire was to check Caesar's views, and strip him of his command. Caesar was ordered to lay down his office and retire to Italy, which he consented to do, provided Pompey, who had an army near Rome, would do the same. The senate insisted on an unconditional resignation, and ordered him to disband his army by a certain day, otherwise he would be declared a public enemy. To this resolution of the triune nobility, Pompey objected; they therefore left the city and cast themselves on Caesar for protection. It was on this memorable occasion that he crossed the Rubicon, and thus defied the senate and its armies, which were under Pompey's command. The events of the civil war which followed have all been recorded in the life of Caesar. It remains only to mention that, after being finally defeated at Pharsalia in 48, Pompey escaped to Egypt, where, by order of the king's ministers, he was treacherously murdered by one of his former centurions as he was landing from his boat. His head was cut off, and afterwards presented to Caesar on his arrival in Egypt. But the magnificent order of execution of the murderer of Pompey. The body lay on the beach for some time, until it was buried by a freedman, Philorus, who had accompanied his master to the shore.

Pompey's younger son, Sextus, by his third wife, endeavoured after his father's death to prolong the struggle with Caesar. He secured a large fleet, manned largely by slaves and political exiles, and occupying Sicily, ravaged the coasts of Italy. But in 36 B.C. he was defeated at sea by Agrippa, and the next year was slain at Mitylene.

Pompey's Pillar, a celebrated column standing on an eminence about 1800 feet south of the walls of Alexandria. It is a red granite monolith, of the Corinthian order, 73 feet high, or with pediment, 93 feet 9 inches; circumference, 23 feet 8 inches. On the summit is a circular depression for the base of a statue. The Greek inscription on the base shows it to have been erected by Publius, prefect of Egypt, in honor of the Emperor Diocletian, supposedly to reerect the famous Pillar of Alexandria. 29320. The popular name was erroneously applied by old travellers.

Ponanu, a seaport town of British India, in the district of Malabar, 30 miles S. of Calicut. Pop. 12,241, mostly Mohammedans.

Ponapé. See Caroline Islands.

Ponce, a seaport of Porto Rico, the second in importance, about 45 miles SW. of San Juan. The harbor is spacious. Pop. (1899, 52,296; 1909, 86,546) produces sugar, cocoa, tobacco, oranges, &c.

Ponce de Leon, Fray Luis, a celebrated Spanish poet, was born in 1527, probably at Granada. He studied at Salamanca, entered the order of St. Augustine, and became professor of Theology there in 1561. His translation and interpretation of the Song of Solomon, later his De los Nombres de Christo (1583-85) and La Perfecta Cassada (1583), full of imagery, eloquence, and enthusiasm, and both in prose. Shortly before his death, which occurred in August 1581, he was taken apprehended of his order. His poetical remains were first published by Quevedo at Madrid in 1631, under the title Obras Propias y Traducciones. The latter consist of translations from Virgil's Eclogues and the Georgics, the Odes of Horace, and the Psalms. His original poems are few, but they are among the masterpieces of Spanish lyrical poetry.

There are German monographs by Wilkens (1866) and Beneck (1873); also a Spanish Life by Tejeda (1863).

Ponce de Leon, Juan, the discoverer of Florida, was born at Sanlúcar de Barrameda, in Spain, in 1496, was a court page, served against the Moors, and in 1562 sailed with Ovando to Hispaniola, and became governor of the eastern part of the island. In 1510 he obtained the government of Porto Rico, and had conquered the whole island by 1512, when he was deprived of his post. He then, broken in health, set out on a quest for the fountain of perpetual youth, and on 27th March 1512 found Florida, landing a little to the north of where St. Augustine now stands. He secured the appointment of adelantado of the country, and, after staying on his way back to drive the Caribs out of Porto Rico, he returned in 1521 to conquer his new subjects; in this, however, he failed, and lost nearly all his followers. He retired to Cuba, and died there in July from the wound of a poisoned arrow. His remains and a monument are in San Juan de Puerto Rico.

Poncho, an important article of male attire in Chili, the Argentine Republic, and some other parts of South America (see Gauchos). It consists of a piece of woollen or alpaca cloth, 5 to 7 feet long, 3 to 4 feet broad, having in the middle a matting through which light weather passes his person so that the poncho rests upon the shoulders and hangs down before and behind.

Pond. See Water-supply.

Pond, John, astronomer-royal, was born in London in 1767, studied at Cambridge, and succeeded Maskelyne as astronomer-royal in 1811. His name is identified with numerous improvements in the methods and instruments of observation; he translated Laplace's Système, and published a star catalogue and many valuable papers. He died 7th September 1836.

Pondicherry, the chief of the French settlements in India, situated on the Coromandel Coast, 33 miles S. by W. of Madras City, is divided into two parts by a canal. White (European) town being next the sea. It has handsome streets, a government house, a college, a lighthouse, and a cotton-mill employing 1500 hands, besides native dyeing establishments. Pop. 41,856. It exports chiefly oil-seeds. The French colony of Pondicherry has an area of 115 sq. m. and a pop. of 140,945. The governor of Pondicherry is governor-general of the French possessions in India. The French first settled here in 1674. The Dutch took the town in 1695, but restored it to the French in 1697. In 1748 Admiral Boscawen besieged Pondicherry for two months, but was compelled to raise the siege. Eyre Coote, however, took it in 1761, yet it was restored to the French in 1763 with reduced territory. It was once more taken by the English by Sir Joseph Banister in 1772, and once more given back in 1785. In 1773 the English again repossessed themselves of it, but it was a third time restored to the French in 1816.

Pondoland, a district of Kaffirland, on the Natal frontier, South Africa, 65 miles long by 30 wide, was annexed to Cape Colony in 1884 and 1887, except Port Natal (Zululand), which (with a pop. of 200,000) was annexed in 1884.

Pond-weed. See Aquatic Plants.

Pongwe. See Pungwe.

Poniatowski, a princely family of Poland.Stanislas (1677-1762) joined Charles XII. of Sweden in supporting Stanislas Leszczynski, and was the chief instrument in saving the Swedish king at Pultowa. He held his administrative
of Capec, with 5172 inhabitants. It has an old cathedral and a castle. It was long attached to the State of the Church. Napoleon I. gave the title of Prince of Pontecorvo to Marshal Bernadotte, afterwards king of Sweden.

**Ponta Delgada**, the largest town of the Azores (q.v.), on the south coast of São Miguel. Pop. 17,940.

**Pontefract**, or POMFRET, a pleasant market-town in the West Riding of Yorkshire, on an influx of the Calder to the Aire, 13 miles SE. of Leeds, 8 E. by N. of Wakefield, and 14 NNW. of Doncaster. It stands on the line of a Roman road, but seems to have arisen round its Norman castle, which, founded about 1076 by Gilbert de Lacy, was the scene of the execution or murder of the Earl of Lancaster (1292), Richard II. (1409), and Earl Rivers (1453), was taken in the Pilgrimage of Grace (1536), and during the Great Rebellion sustained four sieges, being finally dismantled in 1649, after its capture by Lambert. There are two old churches, a town-hall (rebuilt 1766), a good grammar-school of Edward VI. (1549), and large market-gardens and nurseries, the growing of gingerloes for the lozenges called ‘Pontefract cakes’ being a specialty as old as about 1652. At Ackworth, 3 miles south, is a large Quaker school (1778). Pontefract, called ‘the Gulf in the footpath’ was first time it has received its present name between 1086 and 1135. Why is uncertain, but there is a very full discussion of this difficult question in Notes and Queries for 1886–87. The borough, which was chartered by Richard III., lost one of its two members in 1721. The parliamentary borough (1831) 11,515; (1881) 14,767; (1891) 16,407, of whom 9702 were within the municipal boundary. See works by Paulden (1702), Tetzl (1769), and Boothroyd (1807).


**Pontarlier**, a French town (dept. Doubs), 35 miles SE. of Besançon, on the main Jura route from Switzerland to France. Pop. 6759.

**Pontchaillou**, in the department of Loire, France. The drainage of New Orleans (q.v.) is carried into the lake through canals.

**Pontecorvo**, a city of the Italian province of Caserta, on the river Garigliano, 37 miles NW. of Capua, and 5172 inhabitants. It has an old cathedral and a castle. It was long attached to the State of the Church. Napoleon I. gave the title of Prince of Ponte corvo to Marshal Bernadotte, afterwards king of Sweden.

**Ponta Delgada**, the largest town of the Azores (q.v.), on the south coast of São Miguel. Pop. 17,940.
Pontificial, one of the service-books of the Church of Rome, in which are contained the several services, whether in the administration of sacraments or the performance of public worship, in which the bishop or a priest delegated by the bishop officiates. There were many such collections for the various national churches; but that which is now in universal use throughout the Western Church is the Pontificale Romana, first issued in 1435, revised under Clement VIII. in 1596, and repeatedly republished since that time. The Pontificale contains the services for ordinations, for religious professions and receptions of monks and nuns, consecrations, benefications, and similar functions. It is handed over to the incumbent of a church by a bishop of those sacraments which are ordinarily administered by priests. Besides the prayers to be recited, the Pontificale also lays down the ceremonial to be observed.

Pontifical, a village of the French department of Yonne, 18 miles SE. of Auxerre, with a famous Cistercian monastery, dating from the 12th century. Three English archbishops retired hither, Becket in 1164, Beaulieu Langley in 1195, and St. Edmund of Canterbury in 1240, the last being buried here. The monastery was devastated by the Huguenots in 1657, and finally destroyed at the Revolution; but the church (mainly 1150-70) is the most perfect Cistercian church in existence. To the shrine of St. Edmund (18th century) in this church came in 1874 a pilgrimage of English Roman Catholics.

Pontine Marshes (Lat. Pontinæa Paludes), a low-lying district, the southern part of the Campaign of Rome, extending south-east from Velletri to the sea, at Terracina, 20 miles inland. The district is separated from the sea by sandunes, and is traversed by the Appian Way. Herds of cattle, horses, and buffaloes feed on its pastures. Many attempts have been made to drain these marshes, from that of Appius Claudius (312 B.C.) to the proposals of Captain von Donat (1857), amongst the promoters of these drainage schemes being Augustus, Trajan, and the popes Boniface VIII., Martin V., Sixtus V., and Pius VI.

Pontoon (Fr. ponton; Lat. pons, 'a bridge'), the name given to buoyant vessels used in military operations for supporting a temporary bridge. Marlborough used clumsy wooden pontoons. Napoleon and Wellington had them lighter of tin and copper. They were flat-bottomed, rectangular boats, open at the top. Tin cylinders were then used for some time, but light open boats are now carried by the pontoon troops of the Royal Engineers for large bridges capable of carrying artillery, and Berthon's collapsible boats are sometimes used for small infantry bridges. See BRIDGE, Vol. II. p. 447; and for pontoons in connection with floating-docks, see Dock, Vol. IV. p. 32.

Pontoppidan, Erik, Danish writer, born at Aarhus on 24th August 1688, was appointed professor of Theology at Copenhagen in 1738 and bishop of Bergen in Norway in 1747; there he died on 20th December 1764. His writings are principally historical and theological; amongst them must be mentioned Annales Ecclesiæ Danicae (1741-52), and his Historical Dictionary of the Danish Language, and still of use as a book of reference; Det Danske Atlas (1781), an unfinished historical and topographical account of Denmark; Glossæster Norwegicæ (1749), a work on Norwegian dialect words; Explanation to Anther's Catechism, used as a text-book in Town of the present day; Moreres Danica (2 vols. 1739-41), a collection of Danish inscriptions; and Norges Naturtids Historie (2 vols. 1752-54; Eng. trans. Natural History of Norway, 1763), containing accounts of the Kraken, the sea-serpent, and other marvels.

Pontresina, a tourist centre in the Swiss canton of Grisons, stands in the Upper Engadine, on the road connecting with the Bernina Pass, and is much frequented by Alpine climbers. Pop. 383.

Pontus, the name given by the ancient Greeks to a country in the north-east of Asia Minor, bordering on the Pontus Euxinus (whence its name), and extending from the Black Sea west to the frontiers of Colchis and Armenia in the east. Its southern limits were the ranges of Anti-Taurus and Paryades, so that it corresponded pretty nearly to the modern pashalikks of Trebizond and Sivas. The name seems to have come into use after the time of Alexander the Great, and it is obvious that Pontus was governed by a satrap for the empire of Persia. One of these satraps, Ariobarzanes, early in the 4th century B.C., laid the foundations of an independent sovereignty. He
POOLE

A game played on a billiard-table. Any number may play. Each is provided with a coloured ball, taken at random from a pool-basket. The first in order (white) is spotted on the billiard-table. The next (red) plays from hand on the white. Red is called white's player. The next (yellow) is red's player, and so on, in the order indicated by the marking-board. The owner of each ball has three lives. If the player holes the ball he plays on, or any other ball, after having hit first his own ball he plays on, the owner of the ball hole loses a life, and has to pay to the player a sum previously agreed on. The player plays again, from where he stopped, on the nearest ball; and so on until he fails, when the next player goes on, or until there are no other balls on the table, when the striker's ball is spotted. After the stroke from hand the player, unless spotted, always plays from where he is on the table; when he is holed he plays his next stroke from hand. If the player holes his own ball or gives a miss he loses a life, and plays his next stroke from hand. When the owner of a ball has lost all his lives he is declared, and plays no more that pool. The first dead may star—i.e., may come in again with the smallest number of lives on the board. In the end one or two of the players, who have not lost all their lives, remain in. They continue to play until they have an equal number of lives, when they divide the pool (a sum contributed by each player, generally equal to the value of three lives, the star paying an extra pool). If one of the two who remain in has more lives than the other, and kills his adversary, he takes the whole pool. The above describes briefly what is called following pool. The principal varieties are selling pool, where the player may play on any ball he likes; and black pool, where an extra ball is spotted on the centre spot and has to be played on under certain conditions, about which there are no fixed rules. When the black is holed black pool each of those in has to pay a life; if missed or run off in the player has to pay a life all round. There is no pool, and no one has any specified number of lives, the game continuing for a given time (generally half an hour). Snooker pool is played in the same way as moorder (see PYRAMIDS), the players following each other as at pool, and the order of play being determined as at pool.

POOLE

A sea-port in Dorsetshire, 5 miles W. of Bournemouth and 30 E. of Dorchester. It stands on the north side of Poole Harbour (7 by 43 miles), an irregular inlet, formed by the projection of the 'Isle' of Purbeck, almost dry at low-water, and having a day. On Brownsea or Brownsea Island, just within the narrow entrance to the harbour, is a castle dating from the time of Henry VIII. Poole itself has an old town-hall (1572), a guildhall (1761), a town-house (1822), considerable shipping, some yacht-building, and a large trade in pottery's for the clay. The men of Poole are great fighters in days of old by land and sea, as buccaneers, smugglers, and Cromwellian soldiers. There was 'Arripay,' or Harry Page, who about
POORE

1400 kept the seas against France and Spain; and there was William Thompson, who, with a man and a boy, captured a French privateer in 1683. Till 1867 the borough returned two members, and the town till 1851 (1831) 923; (1811) 12,310; (1891) 15,405. See works by Hutchins (1789), Sydenham (1839), and Brannon (3d ed. 1859).

Poore, John, playwright, born in 1792, died in February 1879 at Kentish Town, London, wrote the immortal Paul Pry, first produced at the Haymarket in 1821, and several other pieces and comedies, such as Turning the Tables, Dead as a Post, Twouid Puzzle a Conjuror, The Wife's Stratagem. Besides these theatrical pieces he wrote also the satirical Little Pilottington (1839), The Comic Sketch Book (1839), Comic Maccaroni (1843), Comic Almanac (1845), and other books of a light, humorous kind.

Poole (or Pool; Latinised Polus), Matthew, divine, was born at York about 1624, educated at Emmanuel College, Cambridge, and held from 1648 till the passing of the Act of Uniformity (1662) the rectorcy of St Michael le Querne in London. He died in London and was buried there in 1679. His principal work was his Synopsis Criticorum Biblicorum (5 vols. fol. 1669-76), in which the opinions of 150 biblical critics were summarised. In his English Annotations on the Holy Bible he had only reached Isaiah when he stopped, but his work was completed by his friend (2 vols. fol. 1683). Effective contributions to the funerary controversy were The Nullity of the Romish Faith (1666) and Dialogues between a Popish Priest and an English Protestant (1667).

Poore, William Frederick, the compiler of the Index to the Salem at Salem, Massachusetts, 24th December 1821, and graduated at Yale in 1849. While there he was librarian of a literary society, and prepared an index (pp. 154) of periodical literature, enlarged in the 2d and 3d editions (pp. 1469), the latter published in 1882, with the assistance of the American and British Library Associations. A supplement (pp. 496), by Poole and W. J. Fletcher, of Amherst, was issued in 1888. A similar one was promised for every five years; further issues are in 1893 and (after Poole's death) 1897.

Poole was librarian of the Boston Athenaeum, and the library of the New Haven Library 1869-73, the Chicago Public Library 1873-87, and the Newberry Library, Chicago, from 1887 until his death at Evanston, Ill., 1st March 1894.

Poonah, or Punna, a town of British India, 119 miles by rail SE. of Bombay, is the military capital of the Deccan and the seat of the government of the presidency during the last half of the year. The city is embrowned in gardens, but its streets are mostly narrow or crooked, and the houses poor. The ruins of the pasha's palace, burned in 1827, still remain. Under the pasha the city was the capital of the Mahratta princes and power; it was occupied and annexed by the British in 1818. Here have been built the Deccan College and the College of Science, the latter for training civil engineers, a normal school and normal college, a high school, and other educational establishments.

The Europeans live chiefly at the cantonments, north-west of the city. The natives manufacture cottons and silks, gold and silver jewellery, ivory and grass ornaments, and clay figures. Pop. (1851) 73,203; (1872) 90,430; (1881) 119,062, of which must be added 20,000 in cantonment; (1891) 160,460. The visitations of the sanitary authorities to native houses during the plague here in 1897 led to riots and murderous assaults.

Poonowood is the timber of the Pooon trees of India and Burma (Calophyllum inophyllum and C. magnifolium). It is very commonly used in the East Indies, particularly in shipbuilding, for planks and spars. See TACAMAHACA.

Poor Clares. See Clare (St).

Poor-laws. Charity, like Christianity, had its origin, or earliest development, in the East. Among the primitive nations of the world almsgiving was inculcated as a religious observance, and is prescribed as such in their sacred records. Among the European nations of antiquity we find a provision for the poor adopted as a matter of state policy. In early times Athens could boast of having no citizen in want; nor did any disgrace the nation by begging. But war at length brought poverty and the paupers, and the state decreed the maintenance of those who were militated in battle, and, at a later period, of the children of those who fell. Pintarch mentions Pisistratus as the originator of the first decree, though others derive it from Solon. By the latter decree those who had armies and the distribution of grain to their soldiers up to their eighteenth year, and then sent them into the world with a new suit of armour. The bounty given to the disabled is mentioned by Lysias, Harpocration, Aristotle, Isocrates, and others; it is variously stated at one, two, and three obols, and it is said that the expenses of the money advanced to them when they had raised themselves to better circumstances. But it must be remembered that these so-called democratic states were in reality slave-holding aristocracies.

Among the Romans the Agrarian Law of Licinius Stoilo (367 B.C.) is the first in which the system is elaborated. It limited the extent of property in public land to be held by each citizen, and directed that all such land above the allotted portion should be taken away from the holders, and given to the poor. The distribution of grain at reduced prices, which at length became gratuitous, was introduced by Caius Gracchus, and lasted till the fall of the Roman empire. Augustus in vain tried to suppress it. In his time 200,000 citizens were thus relieved.

The provision was not administered as a charity, but the latter term is in great favour with the Roman people, because it furnished them with an abundant subsistence without labour; other Roman writers describe its results as disastrous both to agriculture and to manners, creating a nation of mendicants, and causing the land to fall out of cultivation.

In the middle ages the great body of the labouring classes were in a state of serfdom, and looked to their feudal lords for maintenance. The obligation to provide for their slaves, or serfs, seems to have been fully recognised, so that many, encountering in a state of freemen the miseries of want, went back to bondage as a refuge from destitution. The vassals in Saxon England were attached to the soil, and received from their lord a portion of land for the support of themselves and their families. But the Church of Rome constituted herself the great receiver and dispenser of alms. The rich monasteries and abbeys distributed doles to the poor, as is still done at the masques under the Mohammedan system.

In most states of continental Europe the church remains to a larger or smaller extent the public almoner, the state only stepping in to supplement the offerings of the church and voluntary charity when they become deficient. The disincarnation from the church is hardly anywhere so complete as in England. The laws of different countries vary as to the degree of want enabling a pauper to
relief, the extent to which the right to relief is matter of positive right, the conditions which give rise to the claim of relief, the incidents of taxation, and the obligation of the relieving authority.

It is only in Prussia, Denmark, and Sweden that there is any legislative declaration of the right to relief; and only in Britain and Denmark is any special tax imposed for this purpose. On the continent of Europe, generally speaking, the administration of relief falls on the parishes or commune, but the responsibility of supervision undertaken by central departments varies greatly; no workhouse test is applied; and the statistics are not reliable. In northern Europe there has been a more decisive separation of poor-law functions from the rest of social duties. In Denmark the old poor department in 1867–68 to one of elective unions in rural districts, the burgomaster and town-council becoming the poor-law authority in each considerable town. The overseers are amateurs, and medical aid is universal. In Sweden the law formerly rested on the Church Ordinance of 1571, but the statutes of 1871 (translated by Nassaum Jocelyn and criticized by Lamasses) have made great changes, the relief of the able-bodied being prohibited, a direct liability being placed on the larger employers of labour, and a system of poll-taxation introduced. In Norway the location of the district (consists) the poor-law of 1845 was altered in 1863 in the direction of greater strictness, relief being restricted in theory to orphans and persons of unsound mind, and a maximum assessment fixed. Among other sources of income there is an excise duty on beer. In north Germany the old law of 1577 was gradually enlarged—e.g. by the Convention of Gotha and Agreement of Eisenach, dealing with the matter of settlement. In 1867 a law of free settlement was passed, and in 1870 by a general law the period of two years was fixed for pauper domicile. In Prussia this is further developed by a statute of 1871, which connects the Bezirksregierung, or local government, with the parish poor-law authority. The peculiar system of Leipzig (founded on that of Hamburg) is carried on by an Armensdirektorium, amateurs of good social position, who make inquiries and attempt to settle cases by means of a Fragebogen, or question-paper.

In the Hanse towns there was introduced in 1788 a system of voluntary contributions aided by fixed subsidies from the government. This at length resulted in government supply all deficiencies, with a yearly expenditure of 1 per cent. of the cost of the general poor relief. At the treaty of Versailles (1870) Bavaria preferred to remain under her own law of 1816, amended in 1829. In Belgium, known as the classic land of pauperism, there is no poor-rate, but large parochial endowments exist. As in France, there are hospices civiles for indoor relief, and bureaux de bienfaisance for outdoor relief. The law may be enforced on communes by the Deputation Permanente of each province. One-third of the Belgian proletariat are inscribed on the poor-lists (see Laurent, Le Pauvrehomme et les Associations de Prévoyance). In Russia the poor-law has been modified by the communal system of land-tenure and the large amount of unoccupied crown-land. Down to 1864 the landlord was bound to feed the serf, and there were also provincial charitable societies, which supplied regularly 10 per cent. of the poor-law, however, was in that year handed over to the new Zemstvos, or local representative assemblies, who tax real property for this purpose. There is in St Petersburg a Grand Philanthropic Society with numerous branches; and many of the poor-law charity was transferred in the time of Catherine II. with the property of the monasteries. In Italy there is a remarkable absence of compulsory provision, except for lunatics and foundlings, but the charitable foundations amount to more than thirty millions sterling. The laws of 1870 are the last attempt to make a corporation to submit to the supervision of the representative provincial assembly. In Rome the Commissione di Carità has many peculiar features. Holland has no law of settlement.

In Austria each commune is charged with the relief of its poor. All who have legal domicile, or who, being unable to prove their domicile, are resident in the commune, are entitled to relief out of the general assessment. There is no special rate, and the administration is strictly municipal. In many provinces private charity is associated with public; the commune and overseers allow a few chosen inhabitants, who are called 'Fathers of the Poor,' and an officer accountable to the commune. This system is called the 'Pfarrarmen Institute,' and their funds are principally derived from private sources; but they receive a third part of the property of ecclesiastics who die intestate, and certain fines, &c. The 'enlarger system,' or boarding-out system, obtains to a large extent as regards both old and young paupers.

In France the law of 1798 distinctly negatived the right to relief. The present system rests mainly on the ordinance of 1807. The poor-law of 1872. The law of 1867 secured the intervention of the prefect. The relief of the poor is not compulsory, in as far as its distributors may, after making inquiry, refuse relief, except in the case of foundlings and lunatics. The minister of the Interior has a general superintendence of the machinery of relief, as well as the immediate administration of many large hospitals and refuges. The departmental funds are called upon for compulsory relief, but the commune is the main source of public assistance. It encourages and stimulates voluntary charities, and receives gifts for the benefit of the poor. The administration of the hospitals, and of the relief given at the homes of the poor (secours à domicile) is under the separate management of unaided commissions, who co-operate with the communal authorities. The dépôt de mendicité is a large establishment for registering cases of vagrancy, and like the criche is departmental. The work of the public dispensary is largely done by societies of charity at a small salary and with unsatisfactory results, as at Boulogne.

In Holland pauper colonies have been supported by the government. Vagrants, after a short imprisonment, are sent to one of these, under a rigorous system of discipline. Panpers of good character are sent to maintain themselves and their families by agricultural labour in free colonies. The working of the system is pronounced costly and unsatisfactory. A description of the chief voluntary experiments in dealing with the poor in Europe will be found in The Charities of Europe, by John de Liefde (1863).

The annals of the poor in England are neither short nor simple. Severe enactments for the repression of vagabondage and mendicity date from a very early period. In ancient Saxon times the householder was bound to provide for the labourer, and men who had no master were, by the Folknote, assigned to some householder; but when freedom began to prevail this state of things gradually fell into disuse. It is now thrown on the ratepayers to provide for the freeman, and when he failed to provide for himself, by honest labour, he generally took to vagrant begging, often to violence. The statute of Winchester (13th Ed. I., 1285) shows the poor utterly-neglected by the law, and allowed to prey on the unfortunate. Up to the reign of Richard II. the sole idea of English rulers was to treat pauperism as a crime, and repress it by punishment, and by the
most unjust and absurd restrictions on the freedom of labour. The 23d Ed. III. forbad giving alms to vagrants, on pain of imprisonment; and then the laws of settlement had their origin in the attempt to drive the poor labourer to the land. The 12th Rich. II. (1385) was the first statute that makes provision for the impotent poor. The statutes of Henry VII. endeavoured to carry out, by the severest measures, the system of repression. The 27th Henry VIII., chap. 25 (1540), established the principle of compulsory assistance. Each parish was to receive and provide for the impotent, and set the able-bodied to work. Alms were to be collected into a general fund, and indiscriminate almsgiving was forbidden, on pain of forfeiture of ten times the value given. The sturdy beggar was to be whipped when first caught, next to have his ears cropped, and for a third offence to suffer death as a felon and enemy to the commonwealth. In 1547 the following penalties were substituted—viz. branding, on first conviction, with a V on the shoulder, and being adjudged a slave for two years, to be claimed by any one, fed on bread and water, and caused to work by beating, &c. Running away from this tender treatment was punishable with S branded on the face, and slavery for life to the town or parish, on the roads of which the incorrigible beggar was now found necessary to obtain funds for the maintenance of the poor. The collectors were gently to ask every man and woman at church what they would give; but if one could not be persuaded, the bishop was to send for the recusant, and use charitable wiles and means. At last, in the 5th Elizabeth, chap. 3 (1563), provided that he who obstinately refused to give should be handed over to the justices, who were empowered to tax him at their discretion, and send him to jail for default. Ten years later the power of compulsory assessment is given to the justices, and abiding-places are ordered to be provided for the aged and infirm. These statutes culminated in the 43d Elizabeth, chap. 2 (1601), which has formed the basis of the poor-law system of England up to the present time, and was adopted by almost all the parishes of every town and village for the relief of the poor. It directed the justices in every county to appoint three or four substantial householders in each parish to be overseers of the poor, along with the churchwardens. It ordered the relief of the impotent, and the support of old people, and the peaceable able-bodied for the able by means of a convenient stock of flax, hemp, wool, thread, iron, and other necessary ware and stuff.

The great Act of Elizabeth came but slowly into operation. Up to the reign of Charles I., there were many parishes in which no rate was assessed, and which turned away their poor; but the great evils had been remedied, and there is little legislation on the subject for the next hundred years. The 3d William and Mary, chap. 2 (1691), provides that the vestry shall examine the rates, and the parishes pay the rates according to the result of the examination by the vestry, because evils had arisen out of the unlimited power of the churchwardens and overseers giving relief 'for their own private ends,' by which the charge on the parish was greatly increased, contrary to the true intent of the statute. This set the principles of the 23d Ed. III. to the justices to order relief in cases of emergency, a provision which afterwards became a fruitful source of difficulty. The evils henceforth complained of were that many had thrown themselves on the rates, which were paid by a few of the parish; that the parish was found interfering with and displacing industrial labour; that the overseers were acting with unchecked dishonesty; and justices, with restrained liberality, ordering the money of the industrious and prudent to be spent upon the idle and improvident. Efforts were made to remedy these abuses throughout the reigns of the first three Georges, by making the justices act with the overseers, by removing them when necessary, and compelling the parishioners by means of returns and the power of inspection, and by the offer of the workhouse to all applicants for relief. This last provision, made in the reign of George 1. (1728), substituted what is called indoor relief for the allowance made to the poor at the workhouse, and the workhouse system. The workhouse established on Locke's suggestion by Carey at Bristol was one of the earliest. All who refused to be lodged in the house were to be struck off the poor's roll and refused relief. A great increase in the number of workhouses took place; guardians were appointed to guard the pauper children from neglect and improper conduct, and other attempts to improve their administration made. Workhouse Unions were also introduced by Gilbert's Act, 1782, and a succession of acts passed for the protection of parish apprentices. Towards the close of the 18th century a great relaxation took place in the treatment of the poor. The famous Spenhamland Act of 1793 meant the establishment by justices of a minimum rate of wages. The 36th Geo. III., chap. 10 and 22 (1815), ordered the extension of the point, and tended the application for relief. It repealed the workhouse test, and allowed relief to be given in aid of wages. Henceforth outdoor relief became the rule under a variety of systems, which practically turned the poor-laws into a mode of paying wages. In 1891 the amount of these rates was reckoned at £4,000,000. In 1820 it had risen to £7,300,254, the justices being now the 'rating' as well as the 'relieving' authority.

In 1817 a commission of the House of Commons stated their opinion that, unless checked, the assessment would swallow up the profits of the land. Though the two Vestry Acts, which resulted from the commission appointed in 1817, seem to have done something to remedy the evils complained of, a new commission to inquire into the operation of the poor-laws was appointed by Parliament, and this in February 1832. The evidence brought before this commission, with which the names of Bishop Blomfield, Sturges-Bowme, Edwin Chadwick, and Nazaar Senior are always connected, revealed disastrous things. There was want, deficiency, poverty, exhaustion, debtor, and domestic virtue of the lower classes were in some places nearly extinct. The great source of the evil was shown to be the relief afforded to the able-bodied in aid of wages. This aid at first reduced the expenditure in wages, and found favour with farmers and magistrates, who framed scales of relief in accordance with the wants of the people. Five modes of outdoor relief were found in operation: (1) Relief without labour; (2) allowance given, in aid of wages, according to the number of the labourer's family; (3) the Roundman system, in which the labourers were let to the parish, among the employers round; (4) parish work, generally on the roads; (5) the labour-rate, the ratepayers preferring to divide among them the parish, and to pay for it, however valueless, instead of raising a rate. Diminished industry ate away the very root of capital. Farmers turned off their men, or refused to employ them at fair wages, thereby causing a surplus of unemployed labour; they then took them back from the parish at reduced wages, paid out of the rates. From starving the parish came the reply to the queries of the commissioners: 'All our able-bodied labourers receive allowance.' No poor man in such parishes could save; if it was known that he had a fund of savings 'he would be refused work till the savings
were gone, and he had come down to the pauper level. In many places pauperism swallowed up the upper class; discipline, and employment. Poor-law administration confined to the rural districts; it extended all over the country, and into the manufacturing towns, where outdoor relief was a source of constant imposture. The administration of indoor relief was also full of abuses, from want of classification, discipline, and employment. Better food and lodging were provided for idle paupers than working people could procure—better, even, than could be afforded by many of the ratepayers.

In 1834 the commissioners reported that they found the administration 'opposed to the letter and spirit of the act, and destitute of all idea of the well-being of the community.' The commissioners laid down the principle that the condition of the pauper ought to be below the lowest condition of the independent labourer, because every penny bestowed in rendering his condition more eligible is a bounty on idleness and vice, and recommended (1) the cessation of outdoor relief; (2) a central authority to control the administration; (3) unions for the better management of workhouses, and the classification of their inmates; and (4) a complete and clear system of accounts. The bill embodying those recommendations, April 23, 1834, passed its second reading in the House of Commons with only twenty dissenting votes, and became law on the 14th August, as the 4th and 5th Will. IV. chap. 76. This act was not a change of law, but of administration. The orders of the new board restricted overseers, on the formation of a union, to the collection of rates; appointed paid relieving-officers to dispense relief under the directions of the unpaid Boards of Guardians; required the gradual withdrawal of outdoor relief; and enforced classification and discipline in the workhouses. A rapid formation of unions took place under the new board. In the first eight months 112 were formed including 2066 parishes. The pauperised districts experienced a great and immediate relief, numbers of paupers going off when they found that relief involved adequate work or the strictly-disciplined workhouse; wages rose, and the expenditure was reduced on an average 20 per cent. At the accession of George 1. in 1714 the poor-rates amounted, as nearly as can be estimated, to £500,000, equal to 3s. 4d. per head on the population of 5,750,000. At the accession of George 11. the poor-rates were £2,000,000, equal to 6s. 8d.; while in 1834 the population, estimated from the last census, was 14,372,000, and the money expended in relief £2,317,255; equal to 8s. 9d. per head.

In three years the operation of the Amendment Act had reduced the expenditure one-third viz. to £4,044,741. In 1848 the commissioners were exchanged for a public board, which became one of the government departments, with a president, in whom was vested the power of the commissioners, and who held office as one of the ministers of the crown. The Poor-law Board was abolished, and its powers transferred (with various other powers) to a new body, the Local Government Board (q.v.), which accordingly became the central authority for England and Wales in regard to poor-law administration. This board has power to withdraw the powers of outdoor relief, which continues to be in England the most important item. With the aged, the sick, and orphans the guardians deal at their discretion; but stringent rules for the relief of the able-bodied are in operation under the board, whose orders are given in terms of law. Guardians are prohibited from giving relief to the able-bodied out of the house, unless under a supplemental order in emergency. For other places the general rule forbids relief to be given in aid of wages, and requires work to be supplied. Exceptions are made in cases of necessity, and of the unions when necessity arises. The expenditure is strictly guarded and examined by public auditors. A district medical officer, of whom one or more are appointed for each union, attends to all cases of sickness among the poor.

The fundamental rule adopted as to the relief of the poor was that each parish in England and Wales is bound to maintain its own poor. Overseers are required to be appointed in each parish every year; and these (till 1894, along with the churchwardens, till then ex officio overseers) have to provide the relief, and requisition the funds for it, from the rate, which the churchwardens and overseers may levy on all the occupiers of land in the parish, after such rate has been confirmed by the justices. The rate specifies a certain sum in the pound which is to be levied, and the annual value of the various lands is then specified. The rate is thus a local tax on the occupier of the land, and not on the owner, unless he himself is also occupier. Owing to the mischiefs arising from the officials of each parish distributing the funds at their discretion, without uniformity of plan, authority was given to the Poor-law Board of England and Wales in 1834, and a central controlling power was created in 1834 in the shape of the Poor-law Board, now the Local Government Board. When a union is formed the control of the expenditure is chiefly vested in the guardians of that union, who are elected by each parish, and who supervise the management of the union workhouse. They order the overseers of each parish to raise their due proportion of funds by a contribution order issued to such overseers, who are therewith bound to levy the amount by including it in the next poor-rate. The guardians are bound to contract for the provision of clothing, fuel, &c. supplied to the workhouse, by means of sealed tenders, unless the quantity is less than a stated amount. The guardians profess only to relieve destitution already existing, and not to enable persons to keep off impending destitution. Hence they only supply the bare necessities of life. They cannot, for example, advance or lend money to set up a poor person in trade.

Minute regulations are contained in the consolidated poor-law orders of the Board as to the classification of paupers in the workhouse, mode of carrying out the orders of the Board, and the various cases in which the poor are to be maintained. It is provided that every able-bodied person requiring relief from any parish shall be relieved wholly in the workhouse, together with his wife and family, if any, and if not otherwise employed. But the relief may be given out of doors in cases of sudden and urgent necessity, of sickness, accident, and a few other cases. In general relief is confined to persons actually residing in some place within the union, except in case of casual destitution, or sickness and accident. Whenever outdoor relief is given to an able-bodied person half of it is to be in the form of work, which is to be performed only weekly where the pauper is not required to be received into the workhouse. No relief is to be given to able-bodied persons while they are employed for wages or hire by any person; and every able-bodied male person, if relieved out of the workhouse, is to be required to work for a certain proportion of the time by the guardians, and kept so employed while he continues to receive such relief. Wherever a person applies for parochial relief, if he or she has a father or grandfather, mother or grandmother, or child, who is able to maintain such pauper, the parish officers can obtain from him the due proportion of the maintenance relative to contribute a sum towards such maintenance. In some cases the guardians or overseers may employ the poor in public works; but this is
seldom done except on occasions like the Lancashire distress. The law as to the settlement of the poor is somewhat intricate, and gives rise to much litigation. There are various grounds on which this settlement is acquired. Thus, every person has, **prima facta**, a settlement in the parish where he was born, until some other is proved; and there are some cases in which a birth is intended to be registered. This birth-settlement is resorted to. By marriage a woman immediately acquires the settlement of her husband, if he has one, whether the husband be an Englishman or a foreigner. If the husband has no sett of settlement he is to be placed on his maiden settlement. If any person shall be bound by indenture, and reside forty days under such apprenticeship, or has resided three years in a parish, or shall rent a tenement in a parish, and actually occupy the same, and be rated to the poor for one whole year, the rent being not less than £10, and paid by the person so actually occupying the tenement, or shall acquire an estate in land, however small in value, and reside forty days in the parish, or shall buy an estate, and the consideration amount to £50 at least, he shall by these means acquire a settlement. Unless a pauper has acquired a settlement in the parish or union where he receives relief, he is liable to be removed compulsorily to the parish where he last acquired a settlement. Paupers who have resided for one whole year in the parish or union in which they became destitute cannot, however, be removed. The general expense of maintaining the poor is paid out of the common fund, and not by each parish in the union. When a pauper is sought to be removed it is necessary to take him before the justices for examination, and, on proper evidence of his settlement, the justices will make the order of removal, which is an authority to the overseers to take or send the pauper to the overseers of the parish of settlement. If, however, the pauper is too ill at the time to admit of removal without danger, the justices may suspend the order of removal till he is recovered. Whenever a pauper is to be removed the removing union is bound to give notice to the union of settlement; and it is on these occasions that so many obstinate and costly litigations take place as to which is the union of settlement. The union also may appeal to the court of quarter sessions against the removal order; and the quarter sessions may state a case for the opinion of the Court of Queen’s Bench, if any nice point of law should really happen. Evils of litigation were greatly diminished by the Union Chargeability Act of 1835. The Local Government Act of 1894 left the administration of the poor-laws of England with the guardians and overseers. But churchwardens ceased to be ex officio overseers; the parochial electors appoint the guardians, and the parish council appoints the overseers, additional ones being appointed in place of the churchwardens.

Scotland and Ireland have been legislated for separately. Their poor-laws are similar to the English in principle and practice, but are administered by a central board, which supervises the local bodies charged with relief, and in both the rate is levied on the annual value of real property. In Scotland the usual early legislation was passed against stately begging. The assessment by the owners in each landward (i.e. non-urban) parish was set up in 1579 and 1603, and the general policy of the poor-laws was stated in proclamations by the Privy-council in the end of the 17th century. Until the 19th century, however, the poor in Scotland had no parliamentary representation, the voluntary collections at the parish church, administered by the heritors and kirk-session. In spite of the opposition of Dr Chalmers, a new system was instituted in 1845. Relief was administered by a parochial board, appointed by the ratepayers, the burgh magistrates, and the kirk-session; and the board appointed ‘inspectors of the poor’ as relieving-officers. The Scots law differs from the English and Irish in allowing no relief to able-bodied adults, although the able-bodied are not able to work. Outdoor relief is the rule. In 1845 a central board was established, called the Board of Supervision, controlling the parochial board of each parish like the Local Government Board in England, and the parochial poor-laws, although the parochial boards might combine to build workhouses, there are no unions, properly so called, in Scotland. A settlement can be acquired in Scotland by residence of five years. Children follow the settlement of their parents, and wives that of their husbands; and if no other settlement be proved, then the settlement of birth is liable. In Scotland the poor-rate, except in a few cases where the local usage established in 1845 is followed, is universally imposed equally upon owners and occupiers according to the annual value of the houses, works, farms, mines, &c., for which they are paid, and giving appropriate deductions from annual value. The tendency of this system is to approach an assessment imposed upon probable income, the older assessment in Scotland having frequently been laid on means and sub- stance. The assessment, originally laid on the occupiers, was successively transferred to the Local Government Board for Scotland, a semi-independent body being thus superseded by a state department (in Edinburgh, as before). The Secretary for Scotland is president of the board, which through him is responsible to parliament.

In Ireland the Poor-law Act was passed for the first time in 1838, and numerous amending statutes have followed, the code of laws being substantially founded on the English acts. Each union has a workhouse managed by a Board of Guardians elected by the ratepayers. Every destitute person has an absolute right to relief, which is administered almost entirely in the workhouse. The Local Government Act of 1898 made no essential changes. There are special acts of parliament regulating the system of life assurance under which the poor are relieved between England, Scotland, and Ireland respectively.

In recent times a new policy has been devised, and in the German empire carried into practical effect, of providing against the evils which accompany the poor-law by which is meant the law policy, generally known as that of compulsory insurance. The German law of 13th June 1883 on sickness insurance was followed by that of 6th July 1884 on accident insurance, and that of 22d June 1889 on insurance against lifelong dependence and disability. Compulsory contributions are collected, to which the workman, the employer, and the state are all parties. The disability pension is given after
five years' payment, the old age pension after thirty years' payment and after the age of sixty, Where the lowest class of salary. Adequate provisions of the Poor-Laws outdoor and 6d. 1887 while 1891 Ist cost, receive of the 1880 a There Arohbold, the Smith 1882 Sir well-considered 1
1899) public-houses, all 5id. or to ing was Vagrants). were were ing the tenancy of the charge to the state is expected to exceed £4,000,000 sterling. A comparison of the statistics of poor-law administration for England and Wales in 1872 and 1889 is interesting and encouraging. In 1872, the population (1871) of England and Wales being 22,712,266, there were 977,200 paupers, of whom 150,350 were able-bodied adults. The total cost of poor relief was £8,007,403, while the rateable value of property assessed was £107,358,342. In 1889, the population (1891) being 29,001,018, the corresponding figures being 1,206,102 paupers, of whom 394,775 were able-bodied adults; cost, £8,232,472; property assessed, £139,036,307. The burden had diminished from 1s. 5jd. to 1s. 1½d. per £1 (see Vagrants).

In Scotland in 1890, the population (1881) being 4,093,163, the paupers were 62,324; the expenditure, including buildings, was £874,359, contributed to the extent of 70½ by assessment, and the grants in aid 17½, being at the rate of 4s. 4d. per head of population, and 1s. 6d. lower than in England. The cost of the lunatic poor rapidly increases. In Ireland, the population in 1891 being 4,706,102, the average daily number, in 1890, of paupers in the workhouses was 43,536, and on outdoor relief 62,286, together 105,822. In 1889 the total expenditure on poor relief was £853,912. It would be misleading to draw inferences from these figures with respect to the condition of the respective countries, as the practical details of poor relief vary greatly.

In America the system is on the whole similar to the British. Every man is entitled by law to relief from the town of his settlement, the rate being assessed on whole towns, and not on parishes. The poor rate bears upon all paupers who are removable from one state to another. Thus, in Massachusetts the unit of poor-law administration is the town or city, comprising in each case the surrounding rural district; while in New York the unit, generally speaking, is the county. These areas bear the burden of the settled poor: the unsettled poor (including Indians) are a charge upon the state. In New York one year's residence is sufficient to constitute a settlement. The policy in Massachusetts has been to encourage outdoor relief as being more economical, and for this reason to set aside a certain number of almshouses. A Massachusetts becoming a pauper loses his state rights. The acts concerning Workhouses and Paupers in the Revised Code of Massachusetts may be taken to represent generally the state of the law throughout the Union. The former provides that any town may erect a paupers' house and a certain number of almshouses, and support of all poor and indigent persons that are maintained by, or receive alms from, the town; all persons who, being able to work, and not having means to maintain themselves, refuse or neglect to work; all persons who live a dissolute and extravagant life; all persons who have committed and are charged with any felony or unlawful business; and all such persons as spend their time and property in public-houses, to the neglect of their proper business, or by otherwise mis-spending what they earn, to the impoverishment of themselves and their families, are likely to become chargeable paupers. The officers of the poor-law are: the Board of Supervisors, in each county, to take orders and to superintend the administration of the poor-law; the overseers of the poor; and the officers of the local police; and the county court, in each county, to examine and to take orders for the discharge of the poor-law officers. There are provisions for enforcing the claims of kindred and for the immediate relief of strangers. The administration is in the hands of overseers, but the counties elect superintendents, holding office for three years, who are again responsible to a Board of Supervisors. The New York State Board of Charities contracts with the counties for the housing in almshouses of certain classes of the state poor. The State Boards have large general powers in respect of superintending the administration of the poor-law, and correctional system of the commonwealth, and report annually to the legislature on such questions. These boards are mainly nominated by the governor. Their functions and the results achieved are described in Mr Sanborn's Report to the Massachusetts Centennial Commission, 1st February 1876, and in the Report by Mr Henley to the Local Government Board in June 1877 (Parliamentary Papers, vol. xxvii.), on the Poor-laws of certain of the United States, and on the combination there of private charity with official relief. The Massachusetts system is in a specially strong position in Bridgewater and Tewkesbury respectively; the most important establishment in New York state is on Blackwell's Island. Generally the American system is marked by a high degree of classification, variety of work, special educational methods, and liberal treatment in the matter of diet. In the city of Boston, under special statutes, the authority of overseers is largely superseded by a 'Board of Directors for Public Institutions.' The former practice of levying a small poll-tax on poor immigrants was decided by the case of Henderson v. Wickham (4th January 1842). The Board is composed of six members, three elected by the city council, and three appointed by the mayor. With reference to the efforts made by voluntary associations to assist and develop the working of the poor-law in America, Mr Henley reports that this cannot properly be done except under a well-considered regulation having the force of law, and a paid staff of officers acting under orders of representative and responsible administrators, controlled by independent auditors.

There is no poor-law in the Australian colonies, but benevolent asylums for the infirm and destitute have become general, and hospitals are numerous in all the rising towns.

See Sir F. M. Eden, The State of the Poor (1787); Right the Poor's Triumph of Athens, translated by Sir F. G. Lewis (2d ed. 1842); Sir George Nicholls, History of the Poor-laws (1854–56); Emmingham, Das Armenesen und die Armenenvergessung in den europäischen Staaten (Berlin 1879); Poor Relief in different parts of Europe, revised by E. B. Eastwick (1872); Fowler, The Poor-law (1882; new ed. 1890); Glen, The Poor-law Statutes (1873–79); and General Orders of the Poor-law Commissioners (6th ed. 1882). In Scotland, the Digests of Smith (1850) and Reid (1860); Mills, Poverty of the State (1857);Jessopp, Aready (1887); Achevett, The English Poor-law System, Past and Present (1888); Cowen, The Poor-laws of the State of New York (Albany, 1887); works on the poor-law of France by Reinetstein (Leip, 1881), of Germany by Münzberg (1887), and of Austria by Mischler (1890); Cook, The Poor-law of Great Britain (1834 and 1839). Annual Reports of poor-law and Local Government Boards; Reports on Poor-laws in Foreign Countries in Parliamentary Papers, 1875; the works on poor-law of the late Sir Charles Wood; E. F. Lushock, Some Poor Relief Questions (1865); W. Chance, The Better Administration of the Poor-laws (1896); and in regard to old age pensions, the majority and minority reports of the Poor-law Commission (1892-1895), and the committee on charitable and benevolent endowments in the Poor and Orphan Asylum Society, the Poor Law and the Aged Poor (1896); also the articles on Charity, Insanity, Insurance, Mendicancy, Vagrants, Workhouse.
Poor's-roll, in the practice of the law of Scotland, means the list of poor persons who are litigants, but unable to pay the expenses of litigation, and therefore are allowed to sue in forma pauperis. This privilege is only granted on production of a certificate from the parish and elders, setting forth his circumstances to his own knowledge and his general poverty. Notice is given of this to the adverse party, who is allowed time to inquire and oppose the application. Where the applicant is not in Scotland he may make a declaration of poverty before (or in Scotland) e.g. in Ireland. When the court is satisfied of the poverty the next thing is for the court to remit the matter to the reporters appointed by the Faculty of Advocates, who report whether there is a probablis causa—i.e. a plausible cause of action. If this report is made it is considered conclusive, and the party is put on the poor's-roll. This warrant remains in force for two years, and during that time the pauper is exempt from all fees of court, and has the gratuitous services of counsel and agents, whose names appear on a list made by the Faculty and other learned bodies. This provision for enabling paupers to carry on litigation is unknown in England or Ireland; for though a party may also be allowed there to sue in forma pauperis, no provision is made by the court for giving the pauper gratuitous counsel and attorney. There is also a list of poor's counsel in the High Court of Justiciary. By an old custom a panel charged with murder may claim the gratuitous services of the Dean of Facenby. See In Forma Pauperis.

Popayan, capital of the department of Caucu in Colombia, stands in a fertile plain, 5700 feet above sea-level, near the river Cauca. It is a bishop's see, although its cathedral is now in ruins; and it has a university and normal school, and manufactures woollens. Founded in 1537, it rose to considerable importance; but the civil wars and an earthquake in 1827 have done much to reduce it. It is still of some consequence for the trade with Peru. Pop. 9000.

Pope, a fish of the Perch family. See Ruffe.

Pope (Gr. pappos, Lat. papas, 'father;' at first used of all bishops, from the 5th century gradually appropriated in the West to the Bishop of Rome, though still used of priests of the Greek Church), the head of the See of Rome and Patriarch of the Roman Catholic Church. In this article an historic sketch will be given of the papacy as an institution. While the empire remained pagan the history of the bishops of Rome is obscure. Tradition confirmed by the faith of the church represents St Peter as the first Bishop of Rome. His immediate successors must have been recognised by Christians as the heads of Christ's church in the imperial city. Rome, the mistress of the world, was regarded by all men with reverence; all men came thither. So among Christians his bishop held a position of special dignity, and his judgment in ecclesiastical controversies was regarded as weighty. The heresy of Novatian, irregularly ordained Bishop of Rome during the lifetime of Cornelius (251), illustrated the importance of ecclesiastical unity, and so in the end tended to exalt the Bishop of Rome as the vicar of the church on earth.

Under Constantine the empire became Christian, and Rome ceased to be the sole imperial city. The first of these changes vastly increased the dignity of his bishop; the second separated Latin from Eastern, and the heresies of the speculative East found no acceptance in the West; the Bishop of Rome became the champion of orthodoxy, and was recognised by the Council of Sardica (347) as having appellate jurisdiction. Before the end of the 4th century Siricius, in publishing his decreal on clerical celibacy, assumed that the law of the Roman Church was binding everywhere. A great increase in power may be dated from the reign of Innocent I. (402-417), who claimed, as St Peter, superiority over western Christendom. The namesakes of the latter, after the sacking of Rome by the Visigoths, and the reverence which they paid to all things Christian, combined to make Innocent the most powerful person in the Christian city which rose upon the ashes of the imperial Rome. Leonde (440-451) maintained the claim of his see to the patriarchate of the West, while in Rome and Italy his fearlessness and prudence during the invasions of the Huns and Vandals gave him commanding influence. In 476 the empire of the west came to an end; the sole emperor of the Romans reigned at Constantinople. As long as he left Italy alone the papal power was the stronger for his absence. Amid the political disintegration of the West the church remained a stable bond of union; its centre was Rome, and the papal see the head of the Western Church; it was more and more regarded as the leader and defender of the people. Though Theodoric the Ostrogoth, while master of Italy, abstained from interference with the bishops of Rome until shortly before his death, some trouble arose from disputed elections. In 590 the first day of the election the college of cardinals met for the people of the city, but as the interference of the laity led to violence, Symmachus decreed (498) that thenceforward the election should be decided by the votes of the Roman clergy. The reconquest of Italy by the generals of Justinian impaired the papal power, for he treated the pope like a rebellious servant. As the imperial power waned in Italy before the invasion of the Lombards, the pope again became pre-eminent. Neglected by her emperor, Rome found a protector in Gregory the Great (590-604), who was forced by the sufferings of the people to deal with the Lombards as a temporal prince. Yet his work was chiefly spiritual. Under him the right to the patriarchate of the West was firmly established; his holiness, his writings, and his reforms were universally admired; he re-established the ecclesiastical supremacy of the bishops of other lands, and he resented the indignity put upon his see by the assumption of the title 'Universal Bishop' by the Patriarch of Constantinople. Under him the Arian invaders of Italy, the Lombards, were converted; so too, were the Arians of Visigoth Spain; while the heathen English first received the gospel from missionaries whom he sent out. Gregory completed the work of Innocent and Leo, and was the greatest of the three founders of the papacy of the middle ages.

During the 7th century the popes were much troubled by the eastern emperors, who were still lords of Rome and some parts of Italy. The emperors caused elections to the papacy to be submitted to themselves for confirmation, tried to prevent the popes from exercising the rights of the see of St Peter, and treated them as mere officers of their state. Martin I. (649-654), a strenuous opponent of the Monothelite heresy, was seized, carried off to Constantinople, and, after suffering ill Usage, died in exile. Even when the emperors again became orthodox they still humiliated the popes. Meanwhile the papal power was growing in western lands; the English turned from Columban usages, and professed obedience to Rome (684); the Burgundians and Friselanders received the gospel; and early in the 8th century Boniface went on a large part of Germany to the faith, acting on a commission from Gregory II. (715-731). In Gregory's time the Emperor Leo III. forbade the worship and even the use of images throughout his empire,
whence he and his successors who adopted the same policy are called Iconoclasts (image-breakers). Gregory refused to obey his decree, and was upheld by the papal court. In 807, the Emperor Louis the German, a certain imperial governor in Italy, called the exarch, sought to compel the pope to obey his master, and the Italians rose in the pope’s defence. The Lombards took advantage of the confusion to conquer the exarchate. They threatened the lands of the church; no help was to be had from the emperor: Italy was virtually severed from the empire. In his distress, Gregory III. (731–741) appealed for help to the Catholic Frankish forces. Twice Pepin brought an army of Franks to the pope’s relief, and routed the Lombards; he won back from them all that had belonged to the exarchate in Italy, and bestowed it on the Roman see (754). This was the beginning of the temporal power of the pope. In return Pepin accepted from the pope the title of Patrician of the Romans, an acknowledgment of his rights in Rome, and of his duty as the defender of the church. He had already received the papal sanction for the deposition of the Frankish king and his own coronation; the pope’s action in this matter formed a precedent not forgotten by his successors. Pepin’s son, Charles (Charlemagne), again routed the Lombards, and renewed the pope’s dominion; a solemn visit was declared Leo III. (795–816) guiltless of certain crimes with which he was charged, and on Christmas Day, 800, Leo crowned him emperor. It was contrary to the feelings of the age that the church should lack an imperial protector; the breach with the eastern empire was complete, and the imperial throne at Constantinople was held to be occupied unlawfully. While Leo had allowed his cause to be judged by a temporal prince, and had accepted him as master of Rome and emperor, he had assumed as God’s clear the right to bestow the imperial crown, which carried with it the lordship of the world.

During the struggles that preceded the break-up of the Frankish empire the pope generally favoured the princes of the West (or Gaulish) Franks, rather than of the East (or German) Franks. The rise of the Franks thenceforward placed the hands of the great churchmen of the new states. The pontificate of Nicholas I. (858–867) was marked by the successful assertion of the authority of Rome in correcting the vices of princes, and compelling the submission of the most powerful prelates of the church. The Armagnac, a certain German bishop who upheld their king in his evil ways, and even Hincmar of Rheims. His chief weapon against the bishops was a series of early decrees, now known to have been forgeries not emanating from Rome. The lofty policy of Nicholas was pursued, though with less success, by Hadrian II. (867–872). Meanwhile a dispute begun in the time of Nicholas was leading the Greek Church towards schism. During the papacy of John VIII. (872–882) the Saracens established themselves in Southern Italy and threatened Rome, and the courageous pope sought help on all sides against them and his Christian enemies. The anarchy in Italy which followed the extinction of the Carolingian empire had the worst effects on the papacy. Things were darkest in the first half of the 10th century. Competitors for power treated the pope as a puppet, and captains of the church were decided either by the nobles of Rome, or the mob, or any foreign power which chanced to be master of the city. No reverence was paid to the papal office, and several of those raised to it were murdered openly by enemies. John XII. sent for help to Otto the Great, king of Germany, and, by crowning him emperor in 962, revived the empire; he acknowledged Otto as his sovereign, and the Romans swore to elect no pope without the emperor’s consent. Though Otto, his son, and his grandson did something towards restoring the hereditary papacy, however, a terrible attempt to regenerate it failed; and, after the death of Otto III., it was again degraded by falling under the control of the counts of Tusculum. The emperor Henry III. regenerated the papacy by releasing it from the control of the Roman nobles, and conferring it on German churchmen of high character. One of these, Leo IX. (1049–55), commanded the respect of Christendom by his revival of ecclesiastical discipline. He was taken prisoner when attempting to check the Norman invaders of Italy, but the Normans reverenced their captive and accorded him the welcome that was due to the pope as the feudal lord of their conquests, Sicily and Southern Italy. Under the guidance of Hildebrand (see Gregory VII.), the papacy advanced rapidly in power and empire. By a decree of Nicholas II. (1059–61) in 1059 the right of election was vested in the cardinals. After a severe struggle clerical celibacy was enforced, and the clergy thus separated from worldly ties became devoted to the interests of their order and its earthly head. Simony was strictly repressed. A further advance was made when Gregory VII. (1072–84). These and other victories gave to their beneficiaries from lay hands. This touched the sovereignty of lay princes. He was opposed by the Emperor Henry IV. (q.v.). The principle at stake was the church’s independence of the lay power, its dependence on its own visible head, and its consequent salvation from feudal bonds and abuses. Gregory asserted the highest claims, and deposed the emperor, who made a humiliating submission at Canossa in 1077. Pope and emperor each found support, the pope in the discontent of the Germans and in the Normans. War broke out, an antipope and rivals to the emperor were set up. The struggle lasted beyond the lives of Gregory and Henry IV., and was decided in 1122 by the Concordat of Worms, which, though a compromise, was a substantial victory for the papacy. During the struggle the Crusades were brought to Rome, and in 1096 they made him the head of Christendom in arms and the director of its forces. Though disturbed for a few years by a schism, the result of Roman faction, the reign of Innocent II. (1130–43) was a time of greatness. The religious orders had from the first been brought into the service of the papacy, and, through their activities, they made the pope the chief adviser of the popes, and, each order as it was founded laid its new-born seal at the disposal of Rome. Innocent gained much from the support of St Bernard, backed by all the strength of the Cluniac order. Under Hadrian IV. (1154–59), a native of St Albans, named Nicholas Breakspeare, the only Englishman who has been raised to the papal chair, the papacy entered on a struggle with the Emperor Frederick I., who was determined fully to enforce his imperial rights. In theory pope and emperor supplied each the complement of the other’s power, the one being God’s vicegerent in spiritual, the other in worldly things; but the limits dividing their spheres of action were undefined, and when both were strong they were almost forced into hostility. Among the definite causes of dispute was the sovereignty of the pope over certain parts of Italy, which had been assigned by the papacy by the Countess Matilda of Tuscany (died 1115). The popes were upheld by a league of the Lombard cities, which carried on a long war with the emperor; he was defeated, and in 1177 submitted to Alexander III.

The papal authority reached its greatest height under Innocent III. (1198–1216), who ruled as the head of a vast spiritual empire, founded on the
reverence of mankind for righteousness. He was master in Italy. His strife with two emperors ended in the success of his ward, Frederick II., inheritor of the Sicilian throne, whom he crowned emperor. By excommunication he forced the king of England to marry a woman no deeper than John of England, and compelled him to become his vassal. The kings of many nations submitted to his rebukes. The Latin conquest of Constantinople brought the East for a while under the papal obedience, and a crusading army began to extirpate the heresy of the Holy See; the church was retaining all the foundation of the orders of St Dominic and St Francis, which gave the pope well-organised and generally devoted forces in every land. Innocent was the first pope that exercised full dominion over the States of the Church. Their position as temporal sovereigns brought his successors into collision with Frederick II., who, already king of Sicily and Naples, wished to gain Central Italy. Had he done so he would have made the papacy dependent on himself. Gregory IX. (1227-41) and Innocent IV. (1243-54) sought to make it, through his spiritual and temporal, at its disposal. The Italian cities of the Guelfie or papal party were their strongest allies. Innocent declared the emperor deposed, and found allies against him in Germany. The papal resources were strained; money was scarce. Power was in the hands of Frederick, specially from England, and the papacy lost in repulse by its demands. The struggle was continued against Frederick's house until it was extinguished. All danger of subjection to the empire was past; but the papacy owed its final success to Charles of Anjou, who was invested with the kingdom of Sicily and Naples. This gave France an interest in Italy, and led to the subjection of the papacy to the French king. The imperial power having fallen, Boniface VIII. (1294-1303) sought to take the emperor's place as head of Europe. His aims were ambitious and his temper violent. National monarchies were being built up in England and France by strong kings. The claims of Boniface were subversive of their domestic policy; they refused to admit them, and he quarrelled with both. The Italian partisans of Philip IV. of France seized him; he was brutally treated, and died soon afterwards.

Philip procured the election of a Frenchman, Clement V. (1305-16), who resided at Avignon in Provence, afterwards sold to the papacy. There the Avignon was luxuriant and venal; it was a period called the 'Babylonian Captivity,' during which the papacy was under the influence of their powerful neighbour of France. A long struggle with the Emperor Louis IV., in which the popes were successful, injured the reputation of the papacy. During its course men began to criticise the character and claims of the papacy. It was attacked on ecclesiastical grounds by the 'Spiritual Franciscans,' and by scholars like Ockham, and on political by the imperial legates. The cost of the Avignon was luxuriant and venal. Little revenue came from the States of the Church, which fell into disorder during the pope's absence, and large sums were raised from national churches and by corrupt means. Fearing to lose all authority in Italy, Gregory XI. returned to Rome in 1378, but Louis IV. and the French cardinals, in order to lead the schism the cardinals revived the long disused authority of a general council. The Council of Pisa (1409) failed of its object. The reform, as well as the reunion of the church was largely desired. In England Wydill urged apostolic poverty as the only cure for abuses. His teaching was of little practical importance, save that it helped forward the revolt of Bohemia, where the Slavs regarded the Latin church as a foreign power. Many orthodox churchmen desired to see the abuses of the papal court reformed and the churches of the several countries preserved from undue papal interference. By the Council of Constance the schism was closed, and Martin V. (1417-31) was elected pope. He was a man of principle, and an ardent reformer. Martin's wise administration raised the papacy from its low estate; he regained its possessions, and made its power widely felt. The Bohemian war made another council inevitable; it met at Basel in 1432, it attacked Eugenius IV. (1431-47), raised an antipope, and ended in contempt. Meanwhile the Greeks, hoping for help against the Turks, submitted to the holy see. In another respect the papacy was specially affected by the troubles of the Greeks. It readily adopted the learning and influence brought by the Greek emigration to Italy. The aims of Nicholas V. (1447-55) conceived a new ideal. The 15th century was an age of splendour; its magnificence was conspicuous in the lives not merely of princes, but even of nobles, merchants, and bankers. As the papacy outstripped all earthly powers, it became the scene of the arts. It was Rome its seat to impose on the imagination of all the world by an exterior grandeur which should outshine that of the city of any earthly potentate. But his was no vulgar ideal of mere magnificence; Rome to him was to be the protean point of culture in the Christian world; and all this was to typify and render sensible the supremacy of religion.

Under Pius II. (1458-66) the pope again appeared as the natural head of the forces of Christendom. He was the type of the new spirit of the time. The popes of Pius's age had been so loudly and so often praised that it was difficult to inherit the loftiness of his spirit. Whilst pursuing the idea of surrounding the papal dignity with pre-eminent splendour, some, like Paul II. (1464-71), betrayed a sympathy for the pagan renaissance which is unmitigable, and which cannot fail to be destructive of the Papal Church as the spiritual head of the church. Other popes, like Alexander VI. (1492-1503) or Julius II. (1503-13), were bent on founding in the Italian states princes either for their relatives or for the papal states. This is specially true of Alexander (Borgia), whose earlier life had been immoral, and who as pope caused scandal by his undisguised love of worldly pleasures; whilst his son Cesar, an able, unscrupulous man, made matters worse by his crimes.

Meantime the idea of reform had not slept—witness the activity of such a man as Cardinal Nicolas of Cusa—but efforts like his were inspired by individual minds of a specially lofty turn, and at most had the countenance of supreme authority; however widespread, they were local and were not that general, reformative in head and members, which had been so loudly and so earnestly called for. The inevitable day of reckoning came, but in a guise which none expected. In place of reform the Protestant Reformation effected a ruthless breach with the past, and instead of the enforcement of the truth the pope repudiated the pietats of the church was largely desired. In England Wydill urged apostolic poverty as the only cure for abuses. His teaching was of little practical importance, save that it helped forward the revolt of Bohemia, where the Slavs regarded the Latin church as a foreign power. Many orthodox churchmen desired to see the abuses of the papal court reformed and the churches of the several countries preserved from undue papal interference. By the Council of Constance the schism was closed, and Martin V. (1417-31) was elected pope. He was a man of principle, and an ardent reformer. Martin's wise administration raised the papacy from its low estate; he regained its possessions, and made its power widely felt. The Bohemian war made another council inevitable; it met at Basel in 1432, it attacked Eugenius IV. (1431-47), raised an antipope, and ended in contempt. Meanwhile the Greeks, hoping for help against the Turks, submitted to the holy see. In another respect the papacy was specially affected by the troubles of the Greeks. It readily adopted the learning and influence brought by the Greek emigration to Italy. The aims of Nicholas V. (1447-55) conceived a new ideal. The 15th century was an age of splendour; its magnificence was conspicuous in the lives not merely of princes, but even of nobles, merchants, and bankers. As the papacy outstripped all earthly powers, it became the scene of the arts. It was Rome its seat to impose on the imagination of all the world by an exterior grandeur which should outshine that of the city of any earthly potentate. But his was no vulgar ideal of mere magnificence; Rome to him was to be the protean point of culture in the Christian world; and all this was to typify and render sensible the supremacy of religion.

Under Pius II. (1458-66) the pope again appeared as the natural head of the forces of Christendom. He was the type of the new spirit of the time. The popes of Pius's age had been so loudly and so often praised that it was difficult to inherit the loftiness of his spirit. Whilst pursuing the idea of surrounding the papal dignity with pre-eminent splendour, some, like Paul II. (1464-71), betrayed a sympathy for the pagan renaissance which is unmitigable, and which cannot fail to be destructive of the Papal Church as the spiritual head of the church. Other popes, like Alexander VI. (1492-1503) or Julius II. (1503-13), were bent on founding in the Italian states princes either for their relatives or for the papal states. This is specially true of Alexander (Borgia), whose earlier life had been immoral, and who as pope caused scandal by his undisguised love of worldly pleasures; whilst his son Cesar, an able, unscrupulous man, made matters worse by his crimes.

Meantime the idea of reform had not slept—witness the activity of such a man as Cardinal Nicolas of Cusa—but efforts like his were inspired by individual minds of a specially lofty turn, and at most had the countenance of supreme authority; however widespread, they were local and were not that general, reformative in head and members, which had been so loudly and so earnestly called for. The inevitable day of reckoning came, but in a guise which none expected. In place of reform the Protestant Reformation effected a ruthless breach with the past, and instead of the enforcement of the truth the pope repudiated the pietats of
the need of the time. Rome itself furnished a
lamentable illustration of the ruin that had come
upon the church. Clement VII. (1523-34), though
he had his own political aims, was as a man not
unworthy of his office, and by character the least
able of the pontiffs who witnessed Rome ruthlessly sacked (1527), and
that by the troops of Charles V., who during the
first half of the 16th century was the mainstay of
the Catholic cause, and by his dignity as then
emperor-elect the recognised protector of the Roman
Church. The impression made by this event even on
religious minds is well expressed in the measured
but weighty words of Cardinal Sadoletto. 'If
these,' he writes, 'had done their duty on whom
the obligation chiefly rested (I speak not of
the pontiff whose virtues, mildness, and uprightness
are known not as great merely but as admirable),
the priesthood would still be venerated as of old,
and not now exposed to injury and contempt. I
say what I feel, and God and man are my witnesses,
that this best of pontiffs desired to cure these
corrupt morals; but the thing needed the knife,
not the hand that was gentle and kindly; spirit shrank
from strong measures.'

From this point the history of the papacy to the
close of the 18th century falls naturally into three
divisions. From 1530 to the early years of the
17th century there takes place a reconstitution of
the basis of Catholic reform; this follows a century of normal activity on the new
basis thus formed; thirdly, a century of decline
in influence, the term of which is marked by the
conclave in Venice which resulted in the election
of Pope Pius VII.

(1) No time was lost in setting about the work
which now all recognised as the imperative need.
The papacy was not prominent in the work of
reform; but the concomitance given by Rome to men
like Contarini, Pole, and Giberti is sufficient
evidence that the popes themselves did not intend to be
behindhand. The pontificate of Paul III. (1534-
50) witnessed two events of considerable importance
to the future of the church—the institution of the
Jesuits, and the commencement of the Council of
Trent. In 1534 Ignatius of Loyola pronounced
his vows in the presence of the pope, and thus laid
the foundations of that society devoted
entirely to the service of the holy see, with which its
fortunes have subsequently been intimately
associated. The ideal conceived by Ignatius was that
of an order governed by a general whom all should
be bound to obey under vow, who should be
perpetual, possessed of absolute authority, subject
entirely to the pope, but not liable to be restrained
by any chapters of the order.' Paul III., on September
27, 1540, by the bull Regionum militantis, gave
the papal approval to the 'form of life' designed by
the founder. The Council of Trent, whatever be
the portion of it of dogmatic definitions, is essentially
a council of disciplinary reform; but in this place
it requires notice as being a council of which,
though held at a distance from Rome, the central
and effective action really vested in the pope. After
long negotiations the council convoked by Paul III.
met Trent in December 1545. As early as 1542
the papal legates had reached that city; but the
war between France and Germany which then broke
out made the further delay inevitable. It is worth
noting, as showing the influence already pos-
sessed by the newly-founded Society of Jesus, that
two of the bishops sent by the court as papal
theologians. On April 28, 1552, the sittings of the
fathers were suspended for two years. On November
29, 1550, the then pope, Pius IV., convoked it for
the following Easter. The decree of reformation of
moral laws and government, consisting of eighteen
chapters, was adopted in the 52d session. It con-
tained a number of important provisions on the
residence of bishops and parish priests, upon the
qualifications for the priesthood, and for the erec-
tion of seminaries for clerical training. In the 25th
session was passed a series of regulations for the
bishops as a body. The fact is that the council was
then formally confirmed by Pius IV., in 1564. By its declarations on dogmatic theology
the church gave prominence to the differences
existing between Catholics and non-Catholicks, and
thus more sharply divided Christendom into the
spiritual and earthly branches of the church.
The cause of Catholic reform dominated the policy
of Paul IV. (1555-59), and from his time the
constitution of the Roman see in its modern aspect progressed practically without a check.
In this period, too, falls the establishment of adminis-
trative bodies called 'seated congregations,' which
thereafter are the recognised and usual organs for
the exercise of papal power in the government of
the church. Lesser objects were not neglected.
If modern Rome has been for so long the city in
Europe which has attracted and deserved to attract
the crowded and admiring crowds, it is largely due to the continuation during this period
of the works begun under the inspiration of
Nicolas V. It is often forgotten that St Peter's
itself was not completed till 1626.

(2) By the beginning of the 17th century the
papacy was in a remarkable position. It was
in accordance with the circumstances induced by the
Protestant Reformation. Its history in this second
period shows no such stirring events as had marked
the preceding age. But for its future the transfer
of the weight of political power from the House of
Austria to that of France in the second half of the
17th century determined the election of Cardinal Alberoni, to whom was
given the whole weight of the influence of France.
As Clement XI. (1700-21) was in the most im-
portant acts of his reign inspired by Louis XIV.
To our story the reader is referred. The first half of the
18th century, the position of the papacy in its
relations with princes and peoples remained as
it had been before. To some extent also it is
certain that Benedict XIV. (1740-58), by a charm
of character which impressed even one so keenly
alive to the weak side of humanity as Walpole,
stayed off the evil day. But before his death the
signs of disintegration were unmistakable.
Throughout Europe luxury and an accompanying
dissoluteness of manners had increased to shame-
lessness, whilst the school of infidelity in France
began to work as national as papal. The
full effect, moreover, of the displacement of the
imperial House of Austria as the political prop
of the church in favour of France now made itself
manifest, and the Jansenist troubles of the 17th
century bore bitter fruit. The whole church of
France had become involved in the quarrel.
the one side the bishops nominated by the king, insisted, as in duty bound, upon the acceptance of the bull Unigenitus issued by Clement XI., in 1713, whilst on the other a large body of the clergy and a not less large body of the laity resisted a bull involving assent to a lengthy series of abstract theological propositions. Of the violence of these theological disputes, as well as the ulterior motives likely to form an idea, and more than one cool observer believed schism in France to be imminent. Thus, whilst the papacy needed every aid to stem the rising tide of infidelity, it found those on whose help it should have been able to depend involved in infidelity. The inauspicious character of the 19th century was for the papacy a slow agony, the successive stages of which do not call for notice here.

By the suppression of the Jesuits the papacy not merely deprived itself of an able body of strenuous defenders, but cast by the very act dismity among the ranks of many devoted to the church. Moreover, the manner of the fall of the Society of Jesus was not calculated to lessen the weight of responsibility, or it may be said the odium, attaching to so grave an act. It fell with dignity, and the cruelties inferred to have been committed brought forth in unlikely quarters sympathy for the victims. It was natural that onlookers should be more impressed by these more recent occurrences than by the long chain of events which had brought the holy see to view the suppression of the Order as inevitable.

All the principles, all the decrees, were, above all, a fall away, and the Emperor Joseph II. assigned to himself and exercised functions which the popes had ever claimed as pertaining to the supreme ecclesiastical power. The fruitless journey of Pius VI. (1789) to confer with Joseph II. at Vienna in 1782 is the sad proof of the degradation of the papacy. Before long the Revolution which broke forth in France swept away king and priest and all established institutions in church and state, involving Catholic Europe in disorder. An outbreak in Rome fomented by the agents of the French ambassador, forced the pope from Rome as a prisoner (1798); and, after his removal from one place of confinement to another, Pius VI. died at Valence on 29th August 1799, Napoleon having, two years before, in anticipation of his death, given orders on the 1st of January 1797 that he should be elected, and that the papacy should be abolished.

A few words must still be given to the present and fourth period of the modern age of the papacy. Through the instrumentality of schismatic Russia the conclave of cardinals met in the monastery of St Giorgio Maggiore at Venice on the 1st of December 1799. The conclave lasted for nearly four months. Just as the conclave of 1700 was decisive as regards the fortunes of the papacy in the 18th century, so was this of 1800 as regards the 19th century. The possible candidates were numerous; the choice finally rested on the Benedictine cardinal, Chiaramonti. Nothing better illustrates the confusion of ecclesiastical ideas in the 18th century, or a chief source of the weakness of the church, induced by universal suspicion, than the extraordinary impression used by a member of the conclave, Cardinal Langini, in his private diary. Explaining the objections felt by some in the conclave to Chiaramonti, he notes under 12th March 1800, only two days before the election, 'Chiaramonti, as a Benedictine, being suspected of Jansenism.

No one who reviews the history of the 19th century can doubt that events have justified the choice of the cardinals. After enduring shocks which to human eyes seemed to threaten its very existence, the Church proves to be the greatest entity of the greatest potency in the civilised world. That this is so is largely the result of the personal character of Chiaramonti, the new pope, who as Pius VII. (1800-23) combined a conciliatory temper with an uncompro-mising inflexibility when vital principles were involved. The history of his relations with Napoleon I. is sufficient of itself to explain how he, destitute apparently of all human help, won for himself the respect of those who thought that the ablest of statesmanlike minds of the century to the service of the church; and under him and his successors was accumulated a reserve of Catholic strength which is one of the most interesting and remarkable features of the 19th century.

The successors of Pius VII. by the personal purity of their lives contributed greatly to advance this Catholic revival. The reigns of Leo XII. (1823-29), Pius VIII. (1829-30), and Gregory XVI. (1831-46) witnessed an increase of zeal on the part of the Holy See in every way for the development of the spirit of loyalty to the holy see both in them and in the ranks of the Catholic laity. In France the exertions of Montalembert, Lamennais, and others firmly established a new school, which, whilst professing enlightened liberal doctrines, was based on the simple conviction that the development of the spirit of loyalty to the holy see can be accomplished only by an intimate union of its adherents with the Church.

The successors of Pius XI. by the personal purity of their lives contributed greatly to advance this Catholic revival. The reigns of Leo XII. (1823-29), Pius VIII. (1829-30), and Gregory XVI. (1831-46) witnessed an increase of zeal on the part of the Holy See in every way for the development of the spirit of loyalty to the holy see both in them and in the ranks of the Catholic laity. In France the exertions of Montalembert, Lamennais, and others firmly established a new school, which, whilst professing enlightened liberal doctrines, was based on the simple conviction that the development of the spirit of loyalty to the holy see can be accomplished only by an intimate union of its adherents with the Church.
the pontiff issued a circular to the bishops of Ireland in which he condemned as immoral burning and cutting the Plan of Campaign. In June 1801 the pope published an encyclical, addressed to the Catholic bishops, dealing with the principles which should govern the consideration of the questions involved in struggles between capital and labour.

See Anastasius, Liber Pontificalie sine Vita omnium Roman. Pontif. ap. Rev. Itali. Sal. Ili. Baronius (Pagi), Ann. eccles. ex Theilme, Cond. und. lat. Christ., by Bryce's Holy Roman Empire; Creighton's History of the Papacy during the Reformation; Bancroft's History of the Popes; Eustach's History of the Popes; Heeren, Geschichte der ital. Kirche in den Jahren 1485-1610 (trans. 1892-98); Gregorovius, History of the City of Rome in the Middle Ages (1890-92); and various collections of documents, such as the Regesta Pontificum Romanorum, edited by Jaffé. See also the articles BULL, ENSICALIC, INFALLIBILITY, SEM, NORMANS, REFORMATION, ROMAN CATHOLIC CHURCH; and the separate articles on the chief of the popes, as given in the following list, in which the order and dates of accession are taken from P. B. Game's Series Episcoporum, the names of the antipopes being given in italics.
Pope, Alexander, the greatest poet of his age, and the most brilliant satirist that England, or perhaps the world, has ever produced, was born in London on the 21st of May 1688. He was of good middle-class parentage, but not, as he afterwards characteristically endeavoured to make out, of aristocratic descent. His grandfather, Alexander Pope the elder—whose pedigree he attempted to disguise—is said to have been the Orcades, or Earl of Haddington, who was a clergyman of the Church of England. His son, the poet's father, was placed with a merchant at Lisbon, where he became a convert to the Roman Catholic Church. On his return from Lisbon he seems to have followed the trade of a linen-draper in Broad Street, whence, after his marriage with Edith Turner, the poet's mother, he migrated to Lombard Street. Here, on the above-mentioned date—once the subject of much perplexing controversy, but now satisfactorily ascertained—Alexander the younger first saw the light. In his infancy, and indeed up to the age of ten, he does not seem to have been either weakly or deformed. In the opinion of a kinsman, 'it was the perpetual application he fell into in his twelfth year that changed his form and ruined his prospects in life.' This assertion has been repeated in his life, but it is now submitted to and aggravated a misfortune which could hardly have been due to any such cause alone. It is at any rate certain that Pope's application to study must have been both early and intense, for deep traces of thought and culminating arguments are preserved in his penny-press, a product of genius even in his most juvenile poems; and he certainly owed little to his teachers. His education, thanks no doubt to the disabilities created by his inherited crookedness, was unmethodical and imperfect to the last degree. He seems to have passed from the Latin and Greek rudiments, to Blinfield near Wokingham, to which place his father had by that time retired. Yet in this very year he wrote his Ode on Solitude, an insignificant but not unpromising performance, and at fourteen, according to his own account, he composed the poem on Silence, in imitation of Rochester's Nothing, which both in manner and matter is astonishingly nature. It was at the same age that he produced the first of his works which attracted attention, a Translation of the Iliad, a poem memorable above its intrinsic merits from the fact that in it the English heroic idiom, though of course falling far short of the technical perfection to which Pope afterwards brought it, is already beginning to take the new mould into which, in his hands, it was destined to become. It is during the next two years, that is to say, at the marvelously early age of from sixteen to eighteen, that Pope's career as a recognised English poet may be said to begin. For it was at some time during these years (1704-6) that he wrote his Pastorals, which, though not published till 1709, were shown to and highly commended by all the leading critics of the day, and were the means of bringing their young author acquainted with the dramatist Wyndham, whose works were quickly recognised, and with whom he commenced a singular correspondence, the tenor of which he audaciously misrepresented in later life. It was to Wycherley, too, that Pope owed his first introduction, which took place a little later, to London life, where the youth's extraordinary Wyndham talents were quickly recognised, and where he was not long in establishing a friendship with Addison, Steele, Swift, Arbuthnot, and other famous wits and poets of the day. In 1711 he published his Essay on Criticism, a poem which, whether written in 1709 or 1707—and it may have been his invincible habit of committing small acts of dishonesty for still smaller gains that suggested the early date—was a sufficiently splendid achievement for the age either of nineteen or twenty-one. It at once, or nearly at once—for it hung for a little at first at the booksellers—placed him in the front rank of the men of letters of his time. Critical opinions differed, and down to his death, which came on the 30th of January 1744, he continued to differ, as to the degree of merit possessed by this remarkable poem in respect of its matter—some deprecating its critical aphorisms as platitudes, others elevating them into utterances of gnomic wisdom; but its excellences of form are not open to question in any competent judgment. Young as was the author, even on the highest computation of his age, his style had already reached maturity, and his matchless power of expression is here exhibited, if over a less varied subject-matter, yet certainly with a no less anorming mastery than in any of his later works. The year 1715 witnessed the publication of The Rape of the Lock (written, according to Pope's account adopted by Warburton, in 1709), a piece much admired in its day for the accuracy and force in its description of nature; and this was succeeded by that second poem on which Pope's claim to the gift of poetic imagination may perhaps be most securely rested, the Rape of the Lock. Necessarily precluded by the deliberate triviality of its subject from appealing to the higher emotions which imaginative poetry of the serious order arouses, this piece displays, in addition to the exquisite charm of its versification, a grace of delicate fancy which at times almost recalls the creator of Puck and Ariel, and the diviner of the dream-whispers of Queen Mab.

We now reach the commencement of what was probably the most prosperous period of the poet's life. His brilliant success had not yet brought with it much pecuniary profit, but in the year 1713 a project was set on foot by him, and warmly supported by Swift and others of his friends, which was destined not only to add to his fortune, but to place his fortunes on a substantial basis for life. This was the translation of the Iliad, a work published by subscription, in six volumes, intended to appear yearly; the last two, as a matter of fact, were issued together after six years' intermission in 1720. Most imperfectly representative, as might be expected from its great original, it is nevertheless a poem so remarkable for its union of force and elegance, and one which moves with an animation so inspiring and unflagging, that it can be read to-day with no inconsiderable portion of the pleasure which it gave to the contemporaries of the poet. The year of its composition was among the fullest and busiest of Pope's life. In 1716 his father removed from Blinfield to a house at Chiswick, where he resided till his death in the following year. Pope was now the foremost of the literary lions of fashionable London, and almost as universally a personage in the drawing-rooms of ministers and magistrates as in the coffee-houses of the wits. At this period, too, his mind, save for an interval of natural grief at the loss of his father, was probably as unrelated to any character of any very extreme virulence. In 1718 he purchased out of the early profits of the Iliad the famous villa and grounds at Twick-}


POPE

published in 1725 and the following years; and in 1727 appeared the first two volumes of a collection of letters of the first three books of Pope and Swift, a work famous as being the first shot fired in the war between the poet and 'the Dunce.' In March 1728 the third volume appeared, and the furious and scurrilous retorts wrung from the persons ridiculed in it elicited the retaliatory public

This work Pope represented as having been written in reply to their attacks, but it (or a first draft of which) has been ascertained by recent inquiry to have been in existence as early as 1725, and to have been merely withheld until its author he deliberately strong his enemies into a blind and headlong charge. Martinus Scriblerus, in fact, played the part of the lance with which the Spanish picador irritated the bull to frenzy; the Dunciad was the blade poised ready to transfix him. In this immortal lampoon—for it is too personal in all essentials of the word to deserve the title of satire—Pope has rescued the names of a host of insignificant enemies from oblivion; and it is the highest tribute to the extraordinary artistic power of this poem that it can still be read with a pleasure unimpaired by the absolute obscurity of most of its larger bonds, and be a bond of Pope and Swift later, of a more serious cast and of a more general application, and it contains one at least of the poet's most admired passages. But its incorporation with the earlier poem, with its infelicitous substitution of Cibber for Theobald as the personification of Dullness, is to be regretted. The Essay on Man, the first part of which was published in 1733, the Moral Essays, and The Imitations of Horace conclude the catalogue of Pope's poetic works. The first, a didactic poem, intended to commend to the world the not very profound philosophy which Pope had borrowed from Bolingbroke, is from the point of view of execution a masterpiece of weight and wit. The poet's mastery of terce and epigrammatic expression is here seen at its highest; and it has been declared, no doubt with truth, that the Essay on Man contains more lines which have won their way to the rank of universally familiar quotation than any poem of equal length in the language. The Moral Essays and the Imitations exhibited the same qualities exercised upon a series of selected subjects, of, for the most part, a lighter order; and, in the case of the still more famous Essay on Man, it is almost impossible to open a page without coming upon a line or a couplet which has become a household word.

The last few years of Pope's life were marked by no new creative activity, but devoted to the revision of his published works. He suffered during this period from asthma, which in time developed dropy, a disease which ultimately proved fatal to him. He died on the 30th of May 1744, at the age of fifty-six, leaving behind him a literary fame which, despite the passage of a century, is little dimmed even to this day. He had written or revised, in the year before his death, the Essay on Man. As a man the figure he presented to all but a few close friends was always an unamiable one, and modern research into the facts of his life has unfortunately only tended to deepen the impression. It cannot be said that his moral qualities of humanity were painfully prominent in the character of Pope. His vanity was insatiable, and his vindictiveness came near to be so: he committed acts of treachery to men, brutality to women, and ingratitude to both. He showed an extra-

friends. Yet it is certain that to these last he must have revealed many lovable qualities. He was undoubtedly a marked man, and his disposition when appealed to by the sight of want or suffering was genuinely benevolent. It should be remembered, too, in excuse for the acrimony of his satire, that physical misfortunes and accidents of bringing up had combined to render him morbidly sensitive. The application of any personal grief to which his revenge was not more cruel than his sufferings.

The position of Pope in the history of poetry is easier to fix than his rank among English poets; and the historian of literature can in these days assign him a far higher place in his challenge than any one else can. However ardent he can hope to secure for him in contemporary esteem. For the importance and splendour of Pope's con-

tribute to the development of English poetic art are beyond the denial of any one conversant with the facts. It is a truth superior to and independent of the endless and irreconcilable controversy as to the essence and 'true inwardsness' of poetic matter. The poets of the naturalist revival at the end of the 18th century regarded Pope as the brilliant exponent of a false and artificial theory of poetry which had on them Smyth and his followers, unceasingly, led men away from the contemplation of the 'true truth' of things. It has on the other hand been contended with much learning and ingenuity by Mr. Courthope that Pope's theory of poetry, if compared with that which it displaced, was a less distinct and salutary return to nature than that of which Cowper became the pioneer in the later half of the century, and which Wordsworth cherished and practised with such notable results towards its close. But even if this contention leaves us unconvinced, we can still find a very good reason for regarding as invaluable the services rendered by Pope to English poetry. He was virtually the inventor and artificer who added a new instrument of music to its majestic orchestra, a new weapon of expression to its noble armoury. Considered from the point of view of its descriptive and emotional capabilities, the heroic couplet as he received it from the hands of Dryden was an instru-

ment of vast compass but of modifications few and

rule. By force of exquisite sensibility wedded to untiring study Pope theoretically deduced and practically educated its hidden powers; discovered, formulated, and applied the still undiscovered 'discoursing' upon it; and handed it on to posterity in a form whose easy mechanical perfection is attested by the fact that its powers are but too much within the reach of the inferior performer. Considered as a weapon of expression, the heroic couplet of Dryden was a mediaval broadsword which only the mighty thews of its master could wield with any effect. In the hands of Pope it became a rapier of perfect flexibility and temper; and he himself discovered, and acquired mastery over, every trick of fence which it was capable of executing. But to the operation of the rules of art which have sufficed to perpetuate his name; but Pope has lived and will live in English literature, not only as the virtual inventor of a new poetic form, but as an artist without a rival in any age or language in the adaptation of speech to thought. No one who brings a sincere and informed sympathy to The Aeneid, the Epistle of Eloisa to Abélard will deny to Pope a measure of the lyrical gift and no mean power over the softer emotions. But one must admit that to the taste of the present age there occurs a certain coldness and artificiality in his portrayals alike of the face of nature and of the passions; and his verse appeals rather to the brain than to the heart. Ideas and not emotions are his province; but to the metric presentation of ideas he imparts a charm of musical utterance unachieved before his time, and a lucidity
of illustration: a brilliancy of wit, a command of apt and terse expression, and a combined ease and dignity of manner which have never been equalled since. To have done this is to have well deserved immortality as a man of letters; whether it is also to have done that to which the name of poet, the title of poet, the rank of poet, were understood in these days, every man who frames his own definition of poetry must decide for himself.

The editions of Pope have been fairly numerous. The first, by his friend Bishop Warburton, was an answer to Bolingbroke’s attack on Pope’s memory, and appeared within a year of his death. Joseph Warburton’s was virtually a reply to Warburton’s; and the controversy on the power of the poet was revived in the 19th century by Bowles and Roscoe, who each published an edition of his works, and in whose polemics a valuable part. All other editions, however, have been superseded by that of the Rev. Whitwell Elwin and Mr W. J. Courthope, which was founded on a mass of documentary material collected by the late J. W. Croker; the concluding volume, containing Mr Courthope’s biography of the author, was published in 1889. The annotations of the poems are rich and valuable, and the Life questions many of the received opinions of Papinian character and career which all his earlier biographers had lacked the material and some of the critical impartiality to determine.

Pope, John, an American general, was born in Louisville, Kentucky, 16th March 1822, graduated at West Point in 1842, and entered the engineers. He served in Florida (1842-44) and in the Mexican war, and was brevetted captain for gallantry. He was afterwards employed in exploring and surveying the west, until the outbreak of the civil war, when he was appointed brigadier-general of volunteers. In 1861 he drove the guerrillas out of Missouri; in 1862 he captured New Madrid in March and was made major-general, commanded the Army of the Mississippi in the operations against Corinth, and was assigned to the command of the Army of Virginia, with the rank of brigadier in the regular army. For fifteen days in August he faced Lee, but was defeated at the second battle of Bull Run, on the 29th and 30th. He then requested to be relieved, and was transferred to Minnesota, where he kept the Indians in check. He held various commands until 1886, when he retired. In 1882 he became major-general. Pope attributed his defeat at Bull Run to the conduct of General Fitz-John Porter, who was tried by court-martial and cashiered; but this verdict occasioned much interest in which General Grant ultimately took Porter’s side (American Review, December 1862), and in 1886 the latter was restored to the army. Pope died September 23, 1892.

Poperinge, an old commercial town of Belgium, in the province of West Flanders, 4 miles from the French frontier, and 8 miles W. of Ypres by rail. The town has manufactures of lace, linens, and woollen cloths. Pop. 11,065.

Popinjay (Fr. papigur, It. popagallo, Low Gr. papaeos), a parrot; a figure of a bird put up as a mark for archers to shoot at (popinigo being another Scottish form for this sense); see KILWINSING. The green woodpecker is also sometimes called popinjay.

Popish Plot. the name given to an imaginary plot of the Roman Catholics in England during the reign of Charles II., the object of which was believed to be a general massacre of the Protestants. See OATES.

Polar (Populus), a genus of trees, forming along with willows the whole of the natural order Salicaceae or Salicinse (by some regarded as a sub-order of Alcyonaceae) and having dog-eared flowers arranged in catkins, both male and female flowers with an oblique cup-shaped perianth. The seeds have silky hairs, as in willows, and are readily wafted about by the wind. The species are numerous, chiefly natives of the temperate and cold regions of the northern hemisphere. They are large trees of rapid growth, with soft wood, and broad, heart-shaped, ovate, triangular, or lozenge-shaped, deciduous leaves, on rather long stalks. Many of them are very beautiful trees. The catkins appear long before the leaves, and proceed from distinct lateral buds. Few of the poplars are of much value for their timber, which is generally white, soft, and light; but from their rapid growth they are useful as calking firewood, where the scarcity of other fuel renders it necessary to plant trees for this purpose, and they are often planted as ornamental trees, producing an immediate effect of embellishment in a bare situation more readily than almost any other kind of tree. Besides the species known by the name Aspen (q.v.), or Tremulous Poplar, the following seem the most worthy of notice. The White Poplar, or Abele (P. alba), a native of the southern parts of Europe, and reckoned among British trees, but probably not indigenous in Britain, is a tree of 80 feet or upwards, with a fine spreading head, and roundish, heart-shaped, lobed, and toothed leaves, which are smooth, shining, and dark-green above, downy and silvery-white beneath. The wood is used by cabinet-makers, turners, and toy-makers. It is little liable to rot or shrink, and this fact adapts it for various purposes. The tree loves low situations and clay soils. This tree has of late years been introduced in Britain from some unknown cause, like the potato, dying where it previously flourished; whilst other poplars, the most nearly allied, continue to flourish in the same localities. The Gray Poplar (P. cuneata) is very similar to the white poplar, but of more viscous growth, a large spreading tree, the leaves similar to those of the white poplar, but not so white green above or so white beneath. Branch and Male Catkin of Populus alba cuneata. 

Pope
POPPIN

appears to have been introduced into Europe from the East. It is very common in the Punjab and in Persia, and now also in Lombardy and other parts of Italy. It attains a height of 100, or even 150 feet, and is remarkable for its erect form, con- 
tracted head, and very rapid growth. It is often 
planted as an ornamental tree, although not so 
generally as in the end of the 18th century, when it was thought preferable for ornamental 
purposes to every other tree. It is common in 
the streets and squares of town in Britain, and 
is particularly adapted to situations where a long 
horizontal line of any kindfatigues the eye, or where 
it is seen starting up from a mass of lower wood 
or shrubbery. The wood is almost of no value. It 
is generally propagated by layers. The species 
known as Black Italian Poplar (P. monilifera or australis), although it is really a 
native not of Italy, but of North America, and is 
sometimes more correctly called Canadian Poplar, 
the female catkins of which resemble a string of 
pears, is frequently planted both as an ornamental 
tree and for the sake of its timber, which is useful 
for flooring, &c. The leaves are deltoid. It is of 
very rapid growth, and attains a height of 100 to 
120 feet. The Balsam Poplar, or Tacamahac (P. 
balsamifera), a very common ornamental tree in 
Britain, is a native both of North America and of 
Siiberia, and has ovate-oblong leaves, which in 
spring are of a delicate yellow tint, and have an 
agreeable fragrance. The leaf-buds are viscid. 
The resinous exudation of the buds (Tacamahac, q.v.) 
is said to be diuretic and anti-spasmodic; and an 
ointment made from the buds is used for burns, 
wounds, and burns. The resinous exudation of 
the buds of other species, as the black poplar, 
possesses similar properties. The Cottonwood (P. 
canadensis) of North America, particularly abund-
ant on the upper parts of the Mississippi and 
Missouri, is valued as a timber-tree, and has been 
pretty extensively planted in Britain; as has also 
the Ontario Poplar (P. canadensis), a species with 
the same balsamic character as P. balsamifera, 
and chiefly distinguished from it by its larger 
leaves. In size of leaf no other species equals P. 

cquerophylla, a native of the southern states of 
North America, the leaves of which are often 
6 inches long. See Aspen.

Poplin (Fr. popeline; possibly from the town of 
Poperinge, of which an old spelling is Pop-
peling), a fabric which has been long made in 
France, from which country the manufacture 
was introduced into England and Ireland in the 17th 
century by Protestant refugees. Poplin con-
sists of a warp of silk and a woof of worsted, 
and the latter being thicker than the former pro-
duces a corded appearance. The worsted yarn 
gives substance to the fabric, and a soft silky 
face is produced by the way in which it is woven. 
Poplins may be either plain or figured. Irish 
plipins are nearly all made in Dublin; the 
industry has been subject to great fluctuations, 
notwithstanding the efforts to foster it. Figured 
poplins, which were much used about 1870 for 
curtains and covering furniture, are at the present 
time, in Great Britain at least, employed for these 
purposes only to a limited extent.

Popocatepeti ('smoking mountain'), a vol-
cano about 40 miles SE. of the city of Mexico. It 
risen in the form of a cone to a height of 17,784 
feet above the sea-level. No eruption has been 
recorded since 1540; it still smokes, however. It 
is often scaled, and is surrounded by its crater (5165 
feet in diameter, and nearly 1060 deep) a good 
deaI of sulphur is obtained.

Poppy (Pappaver), a genus of plants of the 
natural order Papaveraceae, having a calyx of two 
(or rarely three) sepals, which very soon fall off; 
a corolla of four (rarely six) petals; numerous 
stamens seated on a receptacle; the stigma crown-
ing the ovary, without a style, and in the form of 
4 to 20 rays; the capsule opening by pores under 
the persistent stigma, imperfectly divided into cells 
by partitions as numerous as the rays of the stigma, 
but which do not reach the centre, and the seeds 
extremely numerous. There are numerous species 
of poppy, mostly natives of Europe and Asia, some 
of them found even in very northern regions, but 
most of them in the warmer temperate parts. They 
are herbaceous plants, annual, biennial, or peren-
nial, mostly sprinkled with bristly hairs. They 
have a white milky juice; a disagreeable narcotic 
smell, particularly when bruised; pistillate or 
bipinnatifid leaves, more rarely jagged or toothed 
leaves; and large showy flowers, which readily 

Opium Poppy (Pappaver somniferum):

a, whole plant; b, flower and leaf; c, ripe capsule; d, seed 
and section of do. enlarged. (Bentley and Trimen.)
PORCUPINE

France and elsewhere as another article of food. It is believed that one-half of the oil used for cooking and otherwise for alimentary purposes in France is of this kind. The seeds yield about 40 per cent. of oil, and the oil-cake is useful for manure or for feeding cattle. The oil is sometimes used by painters and by soap-boilers; but it is not good for burning. In the cultivation of the porcupine for oil the seed is often sown in autumn, where the severity of winter frosts is not to be feared; in more northern parts it is sown in spring, and sometimes the seed is scattered on the top of the snow with which the ground is covered. Being very small it needs little or no harrowing. Early sowing is favourable to the size of the plant and the abundance of produce. Hoeing and thinning are advantageous. An open but rich soil is best for the porcupine; and a sheltered situation is necessary, as in exposed situations much of the seed is scattered by the wind. The porcupine does not exhaust the land so much as cola, rape, and some other oil-plants. Harvesting ought to begin when one-fourth of the capsules of each plant are open. It is accomplished by pulling the plants in such a manner as not to shake the seed out of the capsules, and tying them in sheaves, which are placed together in a large or slightly concave position until the ripening of the capsules is completed, when the seed is taken out by shaking the capsules into a tub or on a cloth, great care being used to prevent any earth from the roots getting mixed with them. Some farmers in Flanders sow poppies in alternate rows with carrots. The variety of poppy chiefly cultivated as an oil-plant has flowers of a dull reddish colour, large oblong capsules, and brownish seeds; but the white-flowered variety, with globular capsules and white seeds, is also used. The Oriental Poppy (P. orientalis), a native of Armenia and the Caucasus, a perennial species, is often planted in gardens on account of its very large, fiery-red flowers. Its unripe capsules have an acrid, almost burning taste, but are eaten by the Turks, and opium is extracted from them. Several species are cultivated in Britain, all of them seed, rather than tuberous plants, and troublesome weeds in cornfields in other places apparently quite similar in climate. Among them is the Corn Poppy or Common Red Poppy (P. rhoeas), with bright-red flowers, and deeply pinnate leaves. The petals are mucilaginous and are sometimes eaten; they have a slight narcotic smell; and a syrup made of them is sometimes used as an anodyne in catarrhs and children's complaints; but they are more valued for the rich red colour which they yield. A variety with double flowers is cultivated in flower-gardens, under the name of Coronation Poppy. Among the ancients the poppy was sacred to Ceres.

Poppy-head. See Pews.

Porcupine. A name given to all the members of a family of Rodentia—the Hystricidae. This family contains a number of well-defined genera, which include a good many species. The Common Porcupine (Hystrix cristata) is found in southern Europe, as well as in Asia and Africa, and is one of the largest of rodents; it has a heavy aspect and a grunting voice, whence the name Porcupine (from the French porc, 'a hog,' and spin, 'a spine'). The porcupines of the New World are sometimes included in a separate family; they comprise two well-marked forms—the Erinus (Erethizon dorsatum) of North America and the Prehensile-tailed Tree Porcupines (Cerocetes) of South America. The most marked peculiarity of the porcupine is of course the presence of the quills, which are simply thickened hairs; graduations between ordinary hairs and the thickest and longest spines exist to

Porch of Aldham, Essex (1390).
prove this statement. Occasionally the spines end in a peculiar cup-shaped extremity. The armature of spines is of the greatest value to the porcupine, though their use is entirely for defensive purposes. It is hardly necessary to deny the popular belief that the animal can shoot out its quills like so many arrows; the notion has arisen from the fact that when the animal erects its spines loose ones, sometimes fall out. See ECHIDNA, GLOBE-FISH.

Pordage. See PHILADELPHIANS.

Pordaneone. It, a name for the religious painter Giovanni Antonio Licioino (1483–1539), born near Pordenone in Venetia.

Porifer. See SPONGES.

Porism is defined by Simson as a proposition to demonstrate that some one thing or more things are given, to which, as also to each of innumerable other things, not indeed given, but having the same relation to those which are given, it is to be shown that there belongs some common affection described in the proposition. Playfair defined a porism to be a proposition affirming the possibility of finding such conditions as will render a certain problem capable of innumerable solutions. Owing to the loss of Euclid's three books on porisms, and the obscurity of the account given by Pappus of their contents, there has been much discussion among geometers as to the nature of a porism. The two most important books on the subject are Simson's De Porismatibus in his Opera Religionis (1726), and Chasles's Les trois livres de Porismes d'Euclide (1860). Chasles is of opinion that the porisms were closely allied to the modern theories of anharmonic ratio, homographic division, and involution.

Pork. See Pig for the animal from which pork is procured; DIRT and FOOD for the properties of pork as an article of food; and TUTCHINOSIS for one of the gravest of the diseases affecting the pig. The great headquarters of the trade in pork is the United States. This is partly indicated by the figures given at CHICAGO and HAY; but it will be shown more clearly by the following figures. In 1890 the total number of pigs in the United Kingdom was 2,773,609; in the United States it was in the same year 51,002,780, with a value of $843,418,336. While Britain imports pigs and pig-products (hams, bacon, pork, and lard) to a large extent (mainly from America), the United States exports on a vast scale. In the fiscal year 1889–90 the exports were as follows: hogs, 91,148; bacon, 581,896,677 lb.; hams, 76,591,279 lb.; fresh pork, 279,463 lb.; pickled pork, 79,788,878 lb.; lard, 471,028,238 lb. The value of these pig products in that one year 1889–90 was over $67,670,000.

Porosity. By this term we express the experimental fact that no kind of matter completely fills the space it occupies. On the atomic theory it is obvious that this must be the case if the atoms of matter are spherical, or, indeed, if they have any form save one or two special ones, such as cubes or rhombic dodecahedrons. The Phlogiston philosophers, in their attempts to compress water, proved the porosity of silver by flattening a sp. 're of that metal, filled with water and soldered, 'to water escaped through the silver, and stood in thin drops on its surface. The porosity of liquids is easily shown by mixing alcohol and water. The bulk of the mixture is considerably less than the sum of the liquids of the components.

Porous Jars. See REFRIGERATION.

Porphyrite, one of the crystalline igneous rocks. It consists principally of plagioclase. The ground-mass of the rock is composed of microlites and minute rod-like crystals of plagioclase, dispersed amongst which may occur crystalline granules of hornblende, augite, rhombic pyroxene, mica, ilmenite, magnetite, &c. Sometimes traces of a glassy or devitrified base can be detected. Throughout this ground-mass are scattered porphyrrically larger crystals of plagioclase accompanied by one or more of the following minerals: hornblende, augite, rhombic pyroxene, mica, &c. The rock shows all varieties of colour, and ranges in texture from vitreous and crypto-crystalline up to coarse-crystalline. It is often vesicular and amygdaloidal. It occurs almost as a ring round the summit of the extinct volcanoes of the hill-ranges of the Lowlands, both in the form of lava-flows and intrusivesheets, dykes, and masses. Porphyrite is so closely allied to Andesite (q.v.) that it may be considered as merely an altered variety of that rock.

Porphyrogenitus (Gr., 'born in the purple'), a title given to the Byzantine emperor Constantine VII. (912–959).

Porphyry (Gr., 'purple'), a term originally confined to an Egyptian rock used in sculpture and known as porfido rosso antico. It occurs as a dyke or vein some 60 to 80 feet thick in the granite of Jebel Dokhan (formerly called Mons Porphyrites) in Egypt, between Siout and the Red Sea. It is composed of a felspathic base, in which are disseminated crystals of oligoclase felspar, with some plates of dark hornblende, and grains of an iron oxide. The beautiful pink or red colour of the porphyritic felspar and the fine-grained base is due to the diffusion of the red pseudomorphs of pyroxene through the ground-mass or Piochnomite. The term porphyry is now not used to denote any particular rock, but is applied by architects and others to any igneous rock which, like the porfido rosso antico, has a homogeneous, compact base or fine-grained ground-mass, through which are scattered distinct crystals of one or more minerals. By geologists the term porphyry is seldom used without some descriptive word bracketed with it, as quartz-porphyry, orthoclase-porphyry, augite-porphyry, &c.

Porphyry, one of the greatest Neoplatonist philosophers, was born at Tyre, or at Batanes, in the latter part of the 2nd century (Har. Melch. 'king'); and Porphyry ('one clad in purple') is but a kind of playful synonym for this royal name. He is said by Socrates the historian and by St Augustine to have been originally a Christian; but this seems improbable, although it is unusual that a pagan who was the heir of Origen, or at least held some intercourse with him at Caesarea in Palestine. What is more certain is that he passed at a later time to Athens, where he studied rhetoric under Longinus, the well-known author of the treatise On the Sublime. It was at Rome, however, that he remained about 263, that he found the master who permanently moulded his life. Here he became the most trusted of the disciples of the Neoplatonist

Common Porcupine (Hystrix cristata).
Porson, after a few years in Rome he went to Sicily, where, if St Jerome's account is to be relied on, he wrote his once celebrated treatise in fifteen books against the Christians, now known only from the replies—themselves lost—which it elicited from Methodius of Tyre, Eusebius of Cesarea, and Apollinaris of Laodicea. His book itself was burned by order of the emperors Theodosius II. and Valentinian in 448. He then returned to Rome, and taught there, where he is said to have died, probably about 470. His own most famous pupil was Jambiclus. For a view of Porphyry's position in the history of the Neoplatonic school, see Neoplatonism. He was a very voluminous writer, and, though no very profound thinker, a learned, capable, earnest, and high-minded man. His philosophy keeps close to life and practical duties, its object the salvation of the soul, to be effected by the extinction of impure desires through strict asceticism together with knowledge of God. He was a determined opponent of Christianity, and in his treatise criticized many of its supposed errors and imperfections.

Of his writings the chief are the Lives of Plotinus and Pythagoras; Sententiae; De Abstinentia; and the Epistolæ ad Marcellum, addressed to his wife. There is a complete list in Fabrii's Bibliotheca Græca, v. ed. Harless. See also the lexicons of Vachier and Jules Simon, and Zeller's Philos. der Griechen, vol. ii.; also the monograph by Bouillet (Paris, 1864).

Porpoise (Phocaena). Porpoise is a genus of Cetacea in the family Delphinidae. The species are like dolphins, but have shorter snouts. The Common Porpoise (F. communis) is the most familiar Cetacean on the British coasts, especially to the west of Ireland and Scotland. It is found also on all the coasts of Europe from the Mediterranean northwards, on the coasts of North America, and in the Arctic regions. It is one of the smallest of the Cetacea, its average length not exceeding four feet, although individuals may measure six feet in length. The body is spindle-shaped, its greatest diameter being near the triangular dorsal fin. The skin is perfectly smooth, and destitute of hair. The upper surface is black with a bluish shimmer, but the under side is greyish white. There are from forty to fifty teeth in each jaw, not conical, as in most of the Cetacea, but compressed. The eye is small; the opening of the ear is very minute, like a hole made with a pin. The crescent-shaped blow-hole, with the burns of the crescent directed forwards, is situated exactly over the eyes. The porpoise is gregarious, and large numbers are often seen together, sometimes swimming in file, when their backs, appearing above the surface of the water, suggest the idea of a great sea-serpent; sometimes swimming in fine weather, or when storm is approaching, or even in the midst of a storm. They feed on fish, which the teeth are admirably adapted to catch, and schools of porpoises pursue the vast shoals of herring, mackerel, &c.
He also opened a correspondence with the veteran scholar David Ruhnken of Leyden. His Note brevis ad Tontii Emendationes in Suidam (1790) fired the beyond the one he was a scholar of the highest rank. In 1797 appeared in the Gentleman's Magazine his three sarcastic letters on Hawkins' Life of Johnson; and during 1798 and 1799, in the same periodical, his far more famous and trenchant Letters to Archdeacon Travis, on the Bourke of Veres and Coll. 1799—'the most acute and accurate piece of criticism since the days of Bentley,' says Gibbon. Porson naturally incurred great odium on account of the side which he took in this controversy, and it is said that one old Norwich lady, who had him in her will for a legacy of £300, cut it down to £30 when she heard that he had written a book against Christianity. In 1792 his fellowship ceased to be tenable by a layman, whereupon some friends raised a fund to preserve him from want, and about £100 a year was secured. This he accepted on condition that after his death the money should be returned to the donors, but when they refused to take it back it was used to form a foundation for the Porson prize at Cambridge. He was also appointed to the regius professorship of Greek in the university of Cambridge worth £30 a year.

In 1795 he edited the plays of Eschylus for the Foulis press at Glasgow, and between 1797 and 1801 four of Enquiries, the Hecuba, the Orestes, the Phenissar, and the Medea. He also collated the Harleian MS. of the Odyssey for the Grenville Hours. He married in 1796, but his wife died five months later, to her grief and his of his dilatory and slovenly habits and his thirst for drink. In 1800 he was appointed librarian of the newly-founded London Institution, with a salary of £200, but neglected his duties. He was suddenly struck down with the bilious, the 7th September 1808, and died six days later. He was buried in the chapel of Trinity College, Cambridge. Porson possessed a stupendous memory, unwearied industry, great acuteness, fearless honesty, and masculine sense, but was hindered all his life by poverty, ill-health, dilatoriness, and fits of intemperance. With all his powers he achieved but little, and to justify contemporary admiration there remain, besides the works already named, but a few bon-mots, some brilliant emendations, the posthumous Adversaria (1812), and notes on Aristotle the lexicon of Photius (1822), Paussanias (1820), and Suidas (1834). His Tracts and Criticisms were collected by Kidd (1815).

See 'Porsoniana' in Rogers' Table-Talk (1856), H. R. Luard in Cambridge Essays (1857), and the Rev. J. Selby Watson's Life (1881). His Correspondence was edited by Luard for the Cambridge Antiqu. Soc. (1897).

Port. See STEERING; also PORT WINE.

Porta, GIAMBATTISTA DELLA, Neapolitan physiologist (1543-1615), wrote numerous works on physiology, gardening, arboriculture, pneumatics, and refraction, besides several comedies; his best-known books being Magia Naturalis (1569) and De Humanis Physiognomonia.—For Bacio della Porta, see BARTOLOMMEO.

Port Adelaide. See ADELAIDE.

Portadown, a market-town of Armagh, Ireland, on the Bann, 6 miles S. of Lough Neagh and 25 miles by rail S.W. of Belfast. It is a place of considerable trade in agricultural produce, and manufacture of linen, cambric, and sheeting. Pop. (1871) 6735; (1881) 7890; (1901) 9530.

Portage City, capital of Columbia county, Wisconsin, is at the head of navigation on the Wisconsin River, and on the ship-canal which connects it with the Fox River, 177 miles by rail N.W. of Chicago. Steamboats ply to Green Bay, Lake Michigan. Portage has grain-elevators and iron-works, and manufactures leather, boots, clothing, &c. Pop. (1890) 4346; (1900) 5439.

Portage in Prairie, the market-town of a rich agricultural district in Manitoba, on the Assinibine River, 56 miles by rail W. of Winnipeg. It has flour-mills and grain-elevators, a brewery, a biscuit-factory, a paper-mill, &c. Pop. 3000.—In North America portage (from Fr. porter, 'to carry') means a place where boats or canoes have to be lifted past or carried across one navigable stream and another.

Portalis, JEAN ETIENNE MARIE (1745-1807), jurist, practised law in Paris, was imprisoned during the Revolution, but under Napoleon was chief author of the Code Civil. See CODE.

Portal Vein. See LIVER, CIRCULATION.

Portarlington, a market-town of Ireland, partly in King's County, partly in Queen's County, on the Barrow, 44 miles by rail S.W. of Dublin. It was granted by Charles II. to the Earl of Arlington; and here William III. planted a colony of French and Flemish refugees. In 1712 it returned one member to parliament. Pop. 2357.

Port Arthur, the terminus of the eastern division of the Canadian Pacific Railway, on Thunder Bay, Lake Superior, 993 miles NW. of Montreal. Pop. 3500. See OWEN SOUND.

Port Arthur, or LUSHUNKO, a naval station and arsenal on the peninsula stretching south into the Gulf of Pe-chili, opposite that of Wei-hai-wei, on the Shantung promontory to the south; together they command the entrance to the gulf. The English name is derived from the caption of one of Her Majesty's ships employed in surveying the coasts of Corea and Manchuria. In the middle of the century a miserable fishing village, the port was fortified and provided with docks, electric light, a lighthouse, &c., with the help of German engineers. It was taken by the Japanese in November 1894; and in 1895 it and Ta-lien-wan, on the east coast of the peninsula, were 'leased' to Russia (nominally for 25 years, with power to extend the term). Russian control became absolute in 1894 because of the treaty. The port is small but Russian and Chinese ships; part of Ta-lien-wan is similarly closed. Wei-hai-wei, taken by the Japanese in January 1895, was held by them till 1898, when it was taken over by Britain, to be held under the same conditions as Port Arthur is by Russia. The harbour is shallow, and exposed to some winds, but both strategically and as a coaling-station is important.

Port-au-Prince, the capital of Hayti (q.v.), is situated on the western coast, at the head of a bay of the same name. Pop. 20,000.

Port Breton, in the E. of New Ireland, Bismarck Archipelago, was in 1759 the scene of a disastrous experiment in colonising by French Legitimists under the Marquis du Rays.

Portcellis, a strong timber or iron grating sliding in the jams of the entrance to a castle, which, when dropped to the ground, defended the gate from assailants.

Port Darwin, a magnificent landlocked deep-water harbour of the Northern Territory of South Australia, near Port Orderton, the seat of a port on its shores, is the terminus of the overland telegraph, 1973 miles from Adelaide, and of the cable to Java, and is the starting-point of a short railway (146 miles); pop. 800.

Port D'Envaux. See DURBAN.

Port Dunkirk, a harbour in British East Africa, a little more than 1° S. of the equator.

Porte. See CONSTANTINOPLE.
Port Elizabeth, a seaport of the British colony of the Cape of Good Hope, stands on the western shore of Algoa Bay, by rail 85 miles SW. of Graham's Town and 350 S. of Kimberley. It is the southern gateway of the Cape Colony, and also of the Orange River Free State. Its public buildings, solid and substantial edifices, are the town-house, the provincial hospital, churches, the Grey Institute, a college, a library (20,000 volumes), a museum, &c. There are two parks and several grass-planted squares. The town was founded in 1820, and the population, which was not much above 4000 in 1855, had grown to 13,049 in 1875, and to 23,266 in 1891. Two piers were constructed to protect the harbour in 1881; and an aqueduct, 29 miles long, has brought good water to the town since 1878. The value of the imports has increased from £376,638 in 1855 to an average of about £3,990,000; that of the exports (mainly wool, with ostrich-feathers, Angora goats' hair, and diamonds) from £384,447 in 1855 to an average of some £2,000,000.

Porteous Mob. At Pittenweem in Fife, on the night of 10th January 1736, three smugglers, Andrew Wilson of Kirkcaldy, George Robertson, an Edinburgh innkeeper, and William Hall, robbed the Kirkcaldy excise-collector of over £100. All three were at once arrested, and on 11th March were sentenced to death. In an attempt to break out of the Tolbooth (the 'Heart of Midlothian'), Wilson, 'a squat round man,' stuck fast in a grating, preventing also the escape of Robertson; but the following Sunday, being taken with him to hear the condemned sermon in St Giles' Church, he suddenly seized two of the four soldiers guarding them, and fastened with his teeth upon a third, at the same time crying, 'Run, Georgie, run for your life.' Robertson did not get clear off; Wilson on 14th April was hanged in the Grassmarket. There was some disturbance and stone-throwing, when Captain John Porteous, the brutal commander of the City Guard, fired on the crowd, and killed or wounded sixteen or more men and women. For this he himself was tried and sentenced to death (20th July), but on 26th August was reprieved by Queen Caroline. However, on 7th September an orderly mob burst open the tolbooth, dragged Porteous out, bore him, pleading for mercy, to the Grassmarket, and lynched him—hanged him from a dyer's pole, and slashed at him with Lochaber axes. A drunken footprint of Lady Wemyss and one other man were tried next year for their share in the riot; but both were acquitted, and none of the ringleaders ever was brought to justice. A bill passed the Lords to disqualify the Lord Provost of Edinburgh from ever again holding office, to imprison him for a twelvemonth, to abolish the City Guard, to raise the Nether Port, and to fine the city in £1500 for Porteous' widow; but only the first and last clauses were carried in the Commons, and these only by a casting vote and after the fiercest opposition from all the Scotch members. Indeed the Porteous Riot paved the way for the rebellion of the '45.

See vol. xvii. of the State Trials (1815); Scott's Heart of Midlothian (1818); and Criminal Trials illustrative of the 'Heart of Midlothian' (1818).

Porter, a kind of beer favoured by London porters, hence so called about 1750. See BEER, Vol. II. p. 37.

Porter, David, an American naval officer, was born at Boston, Massachusetts, 1st February 1780, the son of William Porter who had been through the Revolution. He was appointed midshipman in 1798, and lieutenant the year after; saw service against privateers in the West Indies, and against Tripoli in 1801–3; became captain in 1812, and captured the first British war-ship taken in the war. In 1813, with the Essex (32 guns), he nearly destroyed the English whaling-fishery in the Pacific, and took a number of the vessels. In 1814 he was sent to the British in Valparaiso harbour, and Porter returned home on parole. He afterwards commanded an expedition against pirates in the West Indian waters, and was court-martialled for compelling the authorisation of Porter's parole for imprisoning one of his officers. Porter resigned in 1826, and was for a time at the head of the Mexican navy. In 1829 the United States appointed him consul-general to the Barbary States, and then minister at Constantinople, where he died, 3d March 1843. Farragut, it is worth noting, was his adopted son. See the Life (1875) by his son.

David Dixon Porter, admiral of the American navy, who was born at Chester, Pennsylvania, 5th June 1813. He accompanied his father on his cruise against the pirates, and afterwards was for some time a midshipman in the Mexican service. He entered the United States navy in 1829, was employed on the coast survey from 1836 to 1841, when he became lieutenant, and then served till 1845 on the Mediterranean and Brazil stations, afterwards returning to the coast survey. From 1848 to 1853 he was engaged in command of the California mailsteamers. At the commencement of the civil war he was appointed commander of the steam-frigate Powhatan, and ordered to Pensacola; but afterwards he assisted in command of the mortar flotilla, joined Farragut, and in March 1862 was successfully bombarded the New Orleans forts. In command of the Mississippi squadron, he assisted to bring about the fall of Vicksburg (July 1863). A rear-admiral, he bombarded and silenced Fort Fisher in December 1864. Till 1866 he was in the naval academy at Annapolis, he was made vice-admiral in 1866, and in 1870 succeeded Farragut as admiral of the navy. He died at Washington, 13th February 1891.

He was the author of three romances, of Incidents and Anecdotes of the War (1861); A History of the Navy in the War of the Rebellion (1867).

Porter, Endymion (1587–1649), grooms of the bedchamber to Charles I., whom he accompanied (with Buckingham) to Spain, and attended on the field during the Civil War—without actually fighting—till 1648. He had a taste of poets and artists, and wrote many verses. See his Life and Letters by Miss Townsand (1897).

Porter, Jane, authoress of the Scottish Chiefs, was born at Durham in 1776, daughter of an army surgeon who died soon after her birth. She was brought up at Edinburgh and in London, and made a great reputation in 1803 by her high-flown romance, Theddeus of Waverc, which was distanced in its kind in 1810 by The Scottish Chiefs. The hero of the latter is a stilted and preposterous figure enough—as little of the historical Wallace as could well be, yet the book retains its interest for youthful readers, and had the merit of prompting Scott to complete Waverley. Other books were The Pastor's Fireside (1815), Duke Christian of Lüneburg (1824), Tales Round a Winter's Hearth (in collaboration with her sister Anna Maria, 1824), Howard of Effingham (32), The Field of the Foottest (32), The Seaward's Narrative of his Shipwreck and Consequent Discovery of certain Islands in the Caribbean Sea (1831), a clever fiction, edited by her, but almost certainly written by her eldest brother, Dr. Hill of the University of Scot. See and Queries, 1880). With this brother she spent some years at Bristol, and there she died, 24th May 1850.—Another brother, Robert Ker Porter (1775–1842),
was a clever battle-painter, and led a wandering life. He visited Russia on the emperor's commission in 1804, accompanied Sir John Moore's expedition in 1808, became knighted for small services of knight of Hanover in 1832, was afterwards British consul in Venezuela, and died at St Petersburg, whither his sister Jane had gone to join him, 4th May 1845. He published books of travel in Russia, Sweden, Spain, Portugal, Georgia, Persia, and Armenia,—his younger sister, Ann Maria Porter (1780-1839), blossomed precociously into Artless Tales (1793-95), followed by a long series of works, among which need only be named Octavia (1798), The Lake of Killarney (1814), The Hungarian Brothers (1807), The Recluse of Norway (1814), The First of Magdalen (1818), Honor O'Hara (1890), and Burony (1890).

Porter, Noah, philosophical writer, was born 14th December 1811, at Farmington, Connecticut, graduated at Yale in 1831, studied theology, and was for ten years a Congregational pastor. In 1846 he became professor of Moral Philosophy at Yale, and two years later became president of the college. One of the doctors received by him was the Edinburgh L.L.D. in 1836. Of his numerous works may be mentioned The Human Intellect (1868), Books and Reading (1870), Sciences of Nature versus the Science of Man (1871), Elements of Intellectual Science (1872), Elements of Mathematics (1885), Kant's Ethics (1886). Died 4th March 1892.

Port Erin, a port on the south-west coast of the Isle of Man, on Port Erin Bay, 55 miles W. of Castletown, has a breakwater 960 feet long, and a steamboat pier. One mile to the north-east there is a ruinous monument, Port Erin forms part of the parish of 3527.

Port Essington, an inlet in the Coburg Peninsula on the north coast of Australia, forming a fine harbour. On its shores there was from 1831 to 1850 a penal settlement.

Porteus, Belby, was the youngest but one of nineteen children, and was born at York, 8th May 1731, his parents being both natives of Virginia. He was educated at Ripon and Christ's College, Cambridge, and graduated as tenth wrangler in 1752. He was at once made a fellow of his college, took orders in 1757, and became domestic chaplain to Archbishop Secker in 1762. He was one of thesmallest of the Ranelagh and Witterings in Kent (1765), which he soon exchanged for the rectory of Hunton in the same county, the rectory of Lambeth (1767), the mastership of the Hospital of St Cross, near Winchester (1769), the bishopric of Chester (1776), and of London, in succession to Dr Lowth (1787). He resigned Lambeth when made Bishop of Chester, but only gave up Hunton when appointed to the see of London. Bishop Porteus died 13th May 1809. He was a sound Churchman, yet moderate, a great enemy of profanity and Sunday concerts, and a warm advocate of the West Indian slaves. He was a judicious observer of the times, as in his prudently delayed commendation of Sunday-schools. His learning was considerable, and the popularity of his Lectures on St Matthew's Gospel, and especially his Summary of Christion Evidences, was solely due to his being better known to him 'Protons,' and Parr described him as 'a poor paltry prelate, proud of petty popularity, and perpetually preaching to petticoats.'

See the Panegyric, rather than Life, by the Rev. Robert Hodgson (1811), editor of his works in 6 vols.: and a very full account in 1871. See also 1783-85.

Port Famine, the name given by Cavendish in 1587 to a spot in Patagonia on the north coast of the Straits of Magellan. From 1843 to 1853 it was a Chilian penal colony.

Port-Glasgow, a town of Renfrewshire, on the southern shore of the Firth of Clyde, 3 miles ESE. of Greenock and 20 WNW. of Glasgow. It was founded in 1668 by the magistrates of Glasgow as a harbour for their city, the deepening of the Clyde (q.v.) not having yet been thought of. In 1710 it was constituted the head custom-house on the Clyde, and for a while took the lead of Greenock; in 1776 it was incorporated as a municipality; and by the Reform Bill of 1832 it was raised to the rank of a parliamentary borough, uniting with Kilmarnock, &c. to return one member. Built on low alluvial ground, and backed by hills 700 feet high, it has a Doric town-house (1813), a public hall (1874), ruined Newark Castle (1897), a wet- dock of 12 acres (formed since 1854), a large graving-dock (1874), extensive timber-ports, ship-building-yards, iron and brass foundries, &c. Pop. (1841) 6938; (1851) 10,802; (1891) 14,685.

Port Hamilton, a spacious, well-sheltered harbour, formed by three islands of the Nan-han group, 30 miles S. of Corea and 45 NE. of Kejiap (q.v.). It was annexed by Britain as a prospective coaling station in 1885, but abandoned in the following year. It was discovered and named by Belechy in 1845.

Port Hope, a port of entry of Ontario, on the north shore of Lake Ontario, 63 miles by rail E. of Toronto. It has a good harbour, and a trade in lumber and grain, and in the town woollens, buttone, and iron castings are manufactured. Pop. (1881) 5581; (1891) 5042.

Port Huron, capital of St Clair county, Michigan, is on the St Clair River where it issues from Lake Huron, and at the mouth of the Black River, 59 miles by rail NNE. of Detroit. The rivers are crossed by four iron bridges. The city has a fine custom-house (1857), shipyards and dry-docks, sawmills, grain-elevators, and machine and railroad shops. Much pine timber is brought down by the Black River. A railway tunnel passing under the St Clair River connects the town with Sarnia, in Canada (see St CLAIR); there is also a steamer to Sarnia, and steamboats ply daily, except in winter, between Port Huron and Detroit. Pop. (1880) 8883; (1900) 19,158.

Portici, a town on Italy, on the slope of Vesuvius, 5 miles by rail SE. of Naples. Its environs are delightful, and are dotted over with country-houses. The royal palace built (1738) by Charles III. containing 166 rooms, is an agricultural town. There are a small fort, fishing, and sea-bathing. Silkworms are reared and ribbons made. Pop. 12,272.


Port Jervis, a village of New York, on the Delaware River, 88 miles by rail NW. of New York City. It contains railway shops, planing and other mills, glass-works, and manufactories of boots and shoes, glues, and watch-case materials. Pop. (1880) 9657; (1890) 10, 820.

Portland, (1) the largest city and chief seaport of Maine, and capital of Cumberland county, on Casco Bay, 108 miles by rail NE. of Boston. It is situated on a narrow peninsula, embracing 25 sq. m., with broad shaded streets, and handsome public and private edifices. It abounds in custom-houses, post-office, city hall, observatory, and Baxter and Mechanics' Halls. There are rolling-mills, and locomotives, machinery, boilers, stoves, carriages, and shoes manufactured, and sugar and petroleum refined. The harbour, which is deflected by three forts, is large, deep, and well sheltered; there are wharves, elaborate dry-docks, and an important trade is carried on; steamers ply direct to Liverpool in winter. The place was first settled by an English colony in 1632.
PORTLAND

In 1866 a fire destroyed $10,000,000 worth of property. Portland is the seat of Episcopal and Roman Catholic bishops, and was the birthplace of Longfellow. Pop. (1890) 30,423; (1900) 30,145.

(2) PORTLAND, the metropolis of Oregon, and capital of the State, is located on the Willamette River, 12 miles from where it joins the Columbia (about 100 from the ocean) and 772 by rail N. of San Francisco. It has railway communication with St. Paul and Council Bluffs also, and is a port of call for many of the large ocean-going ships coming up to this point. A handsome city, well built, with fine shaded streets, it has a court-house, a United States government building, numerous churches and schools, and an asylum for the insane. There are iron-foundries, machine-shops, sawmills, canneries, breweries, and manufactories of furniture, flour, shoes, &c. Clearing-house returns show $95,000,000 for 1890—exports, $12,000,000. Portland was founded in 1844, and became a city in 1851. Pop. (1870) 8283; (1880) 17,577; (1890) 46,388; (1900) 90,426.

Portland, Dukes of. See Bentinck.

Portland. Isle of, a rocky peninsula of Dorsetshire, connected with the mainland by the Chesil Bank (q.v.), and 4 miles S. of Weymouth by a boating-lift (1855). It is 4½ miles long, 1½ wide, 9 in circumference, and 2890 acres in area. From its highest point, the Verne (495 feet), it shelves with a gradual and almost unbroken slope to Portland bill (20 feet), the southern extremity, where stand two lighthouses (1716–89), showing fixed lights 210 and 13 miles, sea-level, and being well lighted and the Shambles, a dangerous reef, 3 miles south-east, a surf, called the Portland Race, is raised by the rushing of the impetuous tides. The cliffs have in places been worn into fantastic caverns; and ancient raised beaches are well marked near the bill. Portland is of one solid mass of oolitic limestone, which has been largely quarried for building purposes since the 17th century, when Inigo Jones employed it for Whitehall and Sir Christopher Wren for St. Paul's. Goldsmiths' Hall, the Reform Club, and Pall Mall generally are also built of it; and the yearly export now ranges between 50,000 and 70,000 tons.

There are three different qualities of Portland stone, the three strata lying close together. The top bed, called Roach, is unsuited for fine linen weights of itself, but it is hard and durable, and does well for building of dock foundations, and the like. The White Bed, which comes next, yields the best stone for fine buildings. It varies in texture from a fine close grain to the roe-like structure characteristic of oolitic limestone, and is free from shells. Its colour is a pleasing grayish white. The Base Bed, not quite so much quarried as the others, is of finer grain and whiter than the White bed; but it is softer and better suited for internal than external architectural work. An analysis of this stone by Professor Daniel showed the following composition: Silica, 1½; carbonate of lime, 9½; carbonate of magnesia, 1½; iron and alumina, ½; water and loss, 1½; besides which ingredients there is often a trace of bitumen present. Portland stone is also quarried in the 'Isle' of Purbeck and the Vale of Wardour.

The formation of a magnificent harbour of refuge has been described at Breakwater, where also a map is given; most formidable fortifications have moreover been constructed, the Verne in especial being crowned by Fort Victoria. Other vestiges of the 'Isle' are its great convict-prison, dating from 1848, and holding upwards of 1500 convicts (see PRISONS); Portland Castle (1590), built by Henry VIII., and held for Charles I. till 1646; Bow and Arrow Castle, ascribed to Rufus; and Pennsylvania Castle (1806), built by Governor Penn, the great Quaker's grandson. The inhabitants of the 'Isle' long remained a peculiar people, intermarrying, and preserving generation after generation, the many curious eccentricities of the forefathers. The 'Isle' itself is remarkable for its copious and excellent spring-water and for its small breed of black-faced sheep, whose flesh, well known as 'Portland nutton,' is much esteemed for its flavour. Pop. (1851) 3195; (1861) 10,661; (1891) 11,000.

See Damon's Geology of Weymouth and Portland (1860), and an article in the Cornhill (1882).

Portland Beds. See JURASSIC SYSTEM.

Portland Cement. See CEMENT.

Portland Sago. See ARUM.

Portland Vase, a celebrated ancient Roman glass vase or cinerary urn found during the pontificate of Urban VIII. (1623–44) in a niarable sarcophagus (of Alexander Severus, it is thought, and his mother Mammeia) in the Monte del Grano, near Rome. It was at first deposited in the Barberini Palace at Rome, and hence it is sometimes called the Barberini Vase. It was bought in 1770 by Sir William Hamilton (q.v.), and in 1787 by the Portland family, who in 1810 deposited it in the British Museum, where it is now shown in the Glass-Case. The ground of the Portland Vase is of dark-blue glass, and the figures—subjects which adorn it—are cut in cameo style in an outer layer of opaque white glass. In the official British Museum Guide (1890) it is stated that the composition is supposed to represent on the obverse Thetis consenting to be the bride of Peleus, in the presence of Poseidon and Eros; on the reverse of Neptune and Thetis on Mount Pelion. On the bottom of the vase is a bust of Paris. The vase was broken to pieces by a lunatic in 1845, but the fragments were very skilfully united again. The Portland Vase is 10 inches high, and is the finest specimen of an ancient cameo cut-glass vase known. There are only two others of similar character which approach it in beauty—viz. an amphora in the Naples Museum and the Auldio Vase. But fragments of the same kind of glass exist with work upon them quite as fine. In the end of the 18th century Josiah Wedgwood, the famous potter, made fifty copies in fine earthenware of the Portland Vase, which were originally sold at twenty-five guineas each. One of these now fetches £200.

Port Louis, the capital and principal port of the British colony of Mauritius, is situated on an excellent harbour on the northwest coast, and is enclosed by a ring of lofty hills. It is defended by barracks and military storehouses. There are three graving-docks beside the harbour, through which all the commerce of Mauritius (q.v.) passes. The dockage has been considerably improved of late. The city contains the government house, a Protestant and a Roman Catholic cathedral, a royal college, &c. Pop. (1889) 61,170.

Port Mahon (anc. Portus Magonis), the capital of the island of Minorca (q.v.), is beauti-
fully situated on a deep, narrow inlet in the south-east of the island. Its harbour is one of the finest in the British Empire, and is fortified by powerful forts and fortifications. Building stone, shoes, cottons, cattle, and honey are exported. Pop. 13,842. The town was held by the English from 1708 to 1756, and again from 1762 to 1782. It was they who made it a first-class fortress.

**Port Moody.** See VASCANTO.

**Porto Alegre**, capital of the Brazilian state of Rio Grande do Sul, stands at the north-west extremity of the Lagoa dos Patos, by means of which it communicates with the sea. It was founded in 1742, is well built, and has about 35,000 inhabitants. It contains a cathedral, an arsenal, military and normal schools, and a local seminary, and a German club. Most of the wholesale trade is in the hands of the Germans, who number some 3000. Railways bring the produce of the interior down to the port, which, however, can only be entered by ships drawing 8 feet. There are manufactories of pianos, furniture, brandy, and beer.

**Portobello**, a Scottish watering-place on the south coast within the River Forth, 3 miles E. of Edinburgh. Its first house (1742) was built by one of Admiral Vernon's seamen in the expedition against Porto Bello, and hence it derived its name; but it dates, by its extensive extension Jopp, almost wholly from a time later than 1800. An esplanade, 8 mile long, skirts the broad level sands; and there are a promenade pier of 1250 feet (1871), municipal buildings (1878), half-a-dozen churches, and manufactories of pottery, bricks, bottles, &c. **Portobello**, with Leith and Musselburgh, returns one member to parliament. Pop. (1854) 5939; (1891) 8892. By the Edinburgh Extension Act (1896) Portobello was incorporated with Edinburgh.

**Portobelo**, formerly PUERTO BELLO, a decayed seaport of Colombia, on the northern shore of the Isthmus of Panama. It has an excellent harbour, discovered by Columbus in 1502, but has fallen into decay since 1729, when it was stormed by Admiral Vernon. Pop. 1300.

**Porto Ferrao.** See ELBA.

**Porto-Maurizio**, a town of North Italy, stands overshadowed in olive-groves on the Gulf of Genoa, by rail 69 miles SW. of Genoa and 41 E. by N. of Nice, and consists of an old town on the right bank of a shallow river, with a small harbour. Pop. 6500.—The promontory has an area of 468 sq. m. and a pop. of 145,818.

**Porto Novo**, a small port on the Comorand coast of India, 145 miles S. of Maclas by rail. Both the Danes and the Dutch had formerly a factory here. The place is celebrated for the battle fought here on 1st July 1751, when Sir Eyre Coote, with 3000 men, defeated Hyder Ali and an army of 60,000. From 1824 on for some years there was an iron-foundry here, the ore being brought from Salem. Pop. 7823.

**Porto Rico**, or PUERTO RICO, a West India island (Spanish till 1898), lies 75 miles E. of Hayti or St Domingo. An oblong in shape, it has an area of 3390 sq. m., about five-sixths the area of Jamaica, and measures 110 miles east to west, and 40 from north to south. It is traversed from east to west by ranges of mountains, 1500 feet in average height, though Mount El Yunque rises to 3670 feet. From the base of the mountains rich alluvial tracts extend to the sea on all sides, and are watered by innumerable short streams. The higher parts are covered with forests. Rain falls in much greater abundance on the north than on the south of the island. The principal crops are sugar, coffee, and rice (the food of the people), though tobaco, maize, yams, bananas, plantains, and tropical fruits are also raised. Large herds of cattle and horses are fed on the lowland pastures. Gold, copper, iron, lead, and coal have been found, but the industries of Porto Rico are entirely agricultural. The imports consist of cotton and woollen goods, metals, hardware, machinery, minerals and animal products, and provisions, such as rice, flour, ale, fruits, &c., to a total value in 1897 of about $10,715,000; the exports are coffee, sugar, molasses, tobacco, corn, cattle, &c., to a value of about $11,011,500, both import and export trade being chiefly with Spain, the United States, Great Britain, and Germany. The population increased from 135,400 in 1890 to 153,248 in 1898, 363,817 being coloured. Chief towns are San Juan, the capital, Ponce, and Mayaguens. Porto Rico was discovered by Columbus in 1493; Ponce de Leon founded a settlement in 1510. It was loyal and obedient to Spain, notwithstanding an attempted uprising fostered by Colombians in 1825. Occupied by United States troops during the war with Spain (1898), it was ceded to the United States by the peace treaty. An act of congress conferred civil government on the island in 1900.

**Portpatrick**, a decayed fishing-village in Wigtonshire, 10 miles SW. of Stranraer by rail. It is sheltered by high cliffs, and has a pleasant south-westerly exposure, but the coast is rocky and the sea boisterous, while there are no facilities for bathing, although the village enjoys some reputation as a watering-place. Portpatrick is but 214 miles direct north-east of Donaghcloney in County Down, was long the Greta Green for Ireland, and the chief place for the importation into Scotland of Irish cattle and horses, while it was a mail-packet station from 1682 till 1849. A pier was built in 1774, and a great artificial harbour was commenced from Rennie's designs in 1821, but ultimately was found impracticable as a place of shelter owing to the violence of the south-westerly swell and the winds that blow for eight months of the year. The public confidence in the harbour received its death-blow from the wreck of the Orton steamship within the port in 1856, when about seventy souls perished within a few yards of the crowded street. The lighthouse was removed in 1869, and the harbour-works fell quickly into hopeless ruin, after having cost the country £500,000. Pop. of parish 1932, 5299; (1891) 2974.

**Port Phillip**, the gate of Melbourne, dis covered in 1802 by Lieutenant Murray, and named in honour of Captain Phillip, the first governor of New South Wales (q.v.). Victoria itself was originally called the district of Port Phillip.

**Portraits.** Composite, a method of indicating the facial characteristics of a family or group of persons, while at the same time suppressing the peculiarities of individual members. Mr Francis Galton has thus prepared type faces each composed of a number of individuals specially celebrated for some particular branch of art, science, or occupation. The results are recognised as of considerable value to the student of anthropology.

One of the best ways which landscape photographers may adopt is to take full-face photographs of each person composing the group, of such a uniform size that two fixed horizontal lines pass, one through the inner angle of the eyes, the other through the line dividing the lips, while a third fixed perpendicular line equally divides the nose; by this means the photographs are brought approximately to the same size, and corresponding portions of the various faces occupy similar positions. Now suppose there are ten individuals in the group, and that any one negative would require half an hour to produce a good print, then each negative is printed for one-tenth of half
THE SEA-WALL AT SAN JUAN, PORTO RICO.
an hour, and is carefully adjusted so that each succeeding negative occupies the same position on the print as the preceding one; thus a composite portrait will result, each of the ten likenesses having an equal share in its production. Where any characteristic is common to all or several, that peculiarity will be pronounced; where, however, only one or two persons possess the peculiarity, it is more or less tacitly connected with the others, to such an extent that it is visible to the eye of the beholder. By taking a negative of a succession of positives a composite negative will result capable of indefinite reproduction. The result is often a highly idealised portrait representative of the family, the post, state, town, mathematician, golfer, and, &c., and types of the group it represents.

Portree. See SKYE.

Portreeve, once the English name of the principal magistrate in a port town, especially in London (q.v.).

Port Royal. See JAMAICA.

Port-Royal des Champs, a convent of Cistercian nuns, nearly 3 miles SW. of Versailles, which obtained much celebrity during the 17th century. It was built by a monk of the foundation of Montmorency in the early part of the 13th century, and soon after its establishment obtained from the pope the privilege of receiving lay persons, who, without taking monastic vows, desired to live in religious retirement. The discipline of the convent has been described as the most austere of all the French religious houses during the 13th and 14th centuries, one of its worst abuses—that of appointing the superior, not on account of fitness, but from considerations of family or other worldly or political motives—became in the end the occasion of its complete reformation under Marie Anglique Arnauld, the Olympe de Gouges (18th c.). The convent was removed from Paris in 1626, and in 1633 to a new convent, Port-Royal de Paris; and from this time the old establishment of Port-Royal des Champs was exclusively devoted to the use of a lay community. This community soon numbered among its permanent inmates some of the most distinguished scholars of that age, Antony Arnauld, Le Maistre, Anthony and Louis Isaac le Maistre de Sacy, Nicole, Lancelot, Scricourt, and others. Their rule of life was most austere, rising at 3 A.M., devoting much of the morning and afternoon to reading and instruction, and a portion of the day to manual labour. One of their public services was the establishment of a school, for which they prepared well-known educational books, the Port-Royal Greek and Latin Grammars, General Grammar, General Arithmetic (1669), and Scholastic Logic (1673), new ed. by Professor Spencer Baynes, 1881), &c. But Port-Royal is best known for its adherence to the Jansenist movement (see Jansen). The nuns of Port-Royal having refused to subscribe the formulary condemning the Five Propositions, a royal order was issued in 1660 for the suppression of the school and the removal of the boarders of Port-Royal des Champs; and the abbees and several other nuns were arrested, and confined as prisoners in other monasteries. After the 'Peace of Clement IX.' they were permitted to return; but the two communities were placed under a separate government. When the final steps for the repression of the Jansenist party were taken about 1707 a formal bull was issued by Pope Clement XI. for the suppression of Port-Royal des Champs, and the transfer of its property to Port-Royal de Paris. The nuns were finally dispersed and distributed over convents of different orders throughout France. The property of the convent and church was transferred to the Paris house, and all the buildings of Port-Royal des Champs were levelled to the ground by order of the king. See Sainte-Beuve, Port-Royal (4th ed. 6 vols. 1878); Charles Beard, Port-Royal (2 vols. 1861).

Portrush, a watering place in County Antrim, 63 miles by rail N. of Coleraine, and 7 W. by S. of the Giants' Causeway, with which it is connected by an electric tramway (1883). The town is built on the isthmus of a short peninsula, looking to the Causeway cliffs on the one side, and to Inishowen and almost Malin Head on the other. It has fine sands and cliffs suitable for bathing, and has communications by steamer with Morecambe and Glasgow. Pop. 1322.

Port Said, a town of Egypt, on the west side of the Suez Canal, on a desolate strip of land between Lake Menzaleh and the Mediterranean. The place owes its origin to the Suez Canal (q.v.), being named after Said Pasha, its promoter, who, it is believed, drew up the plans and engaged the workmen. The town depends wholly on the canal trade, being mainly a coaling station for steamers. Pop. (1882) 16,560.

Portsea Island, a small island on the south coast of Hampshire, has on its west side Portsmouth Harbour and on its east side Langstone Harbour, and is separated from the mainland on the north by the Hayling bill and the Langstone bridges. It is four miles long by from two to three broad, and contains the towns of Portsea and Portsmouth.

Portsmouth, the chief naval arsenal of Great Britain, and an important seaport, market-town, and municipal, parliamentary, and county borough, in the south of Hampshire, stands on the southwest coast of England and is connected by rail to Portsmouth Harbour, and opposite the town of Gosport (q.v.), with which it communicates by means of a steam-bridge. It is 74 miles SW. of London, 44 W. of Brighton, and 23 SW. of Southampton. Besides the parish of Portsmouth, the limits of the town include: 1st, the Hayling bill, a strip of land which are co-extensive, include also the parish and town of Portsea, and the out-wards Landport and Southsea, and comprise the whole of Portsea Island, with the exception of a small portion in the northeast corner. Pop. of the borough (1821) 29,475; (1851) 79,996; (1871) 133,569; (1881) 197,869; (1891) 159,255. Portsmouth is for the most part a mean-looking, dirty town, but has the most complete fortifications in Britain. These comprise, on the landward side, the outer line of the Ports- mouth town forts and the Hilsen lines; to seaward, the Spithead (q.v.) forts. A portion of the bastioned ramparts, which formerly encircled both Portsmouth and Gosport, and were so imposing in appearance, have since 1872 been removed as useless. Southsea, which is situated outside the walls of Portsmouth, is a fashionable watering-place. In the town proper there are few objects of note. Pleasing views may be had from the ramparts and batteries of the harbour, the roadstead of Spithead, and the Isle of Wight. Many improvements have been carried out in Portsmouth, including improved drainage, and the opening of the Victoria Park in 1878; also a new town-hall has been built at a cost of £140,000, which was opened by the Prince of Wales in 1890. Among the few notable buildings may be mentioned the church of St Thomas, whose chancel and transept were restored from close of the 12th century, the nave and tower from 1898, and which contains a ghastrly cenotaph in memory of the murdered Duke of Buckingham. The Garrison Chapel, Early English style, and fine resting place, stands near the hospital of St Nicholas, founded in 1212 by Bishop Peter de Repibus. In it Charles II. married Catharine of Braganza; and in front of it is buried the brave Sir Charles James Napier (q.v.), who died in this neighbourhood in 1855. The dockyard of Portsmouth, in the district of Old Portsmouth, was till 1872 only 116 acres in extent; but vast
works have since then been carried out at a cost of £2,500,000, which have increased the area to a total of 233 acres. Of this immense naval establishment the most noteworthy, if not the most recent, features are the mast and rope houses, hemp-stores, rigging-stores, sail-lofts, and the dry-docks, spacious enough to admit the largest vessels, and offering every facility for their speedy repair. The twelve docks, 22 to 36 feet deep, are lined with solid masonry, roofed over, and closed by lock-gates. Of the various building-slips, one of them, roofed and covered in, is so large that three or four vessels can be in process of construction under it at the same time. The Wool Mills contain a number of most ingenious block-making machines, the invention of Sir Isambard Brunel (q.v.), in which rough timber, introduced at one end, is cut, squared, drilled, bored, and turned into the required shape. About 150,000 blocks are made here annually, and the machines require the attendance of no more than four men. In the smithy anchors are forged by aid of a Nasmyth's hammer.

The dockyard also contains the residences of the superintendent officers, and a school of naval architecture.

Portsmouth Harbour, about 400 yards wide at its entrance, expands into a spacious basin, extending inland for about 4 miles, and having a breadth of 3 miles along its northern shore. Large war-vessels can enter and lie at anchor at all times of the tide, there being 4 fathoms of water in the channel at low water. The outward entrance is defended by Ports Moumoreon and Gilkieker, and Southsea Castle. The position of this harbour is highly favourable. It is situated in the middle of the channel, close to the magnificent anchorage of Spithead, where 1000 ships of the line may ride without inconvenience, and is under shelter of the Isle of Wight, and opposite the French arsenal of Cherbourg.

The local trade of Portsmouth is chiefly supplied by the dockyard and other public establishments. Brewing is largely carried on. Grains, potatoes, corn, and timber are imported from British coasts, and potatoes, granite, corn, timber, cattle, and wine from abroad. The only exports are pottery (shipped at Fareham) and coal-tar pitch.

The importance of this port dates only from the reign of Henry VIII. Its defences were commenced by Edward IV. and strengthened by Elizabeth, and afterwards strengthened and made more thorough by Master and Sir William III. Here, in a house that still remains in the High Street, and which was then an inn called the 'Spotted Dog,' the Duke of Buckingham (the 'Steenie' of King James) was assassinated by John Felton. On the 29th of August 1792, when its commander, Admiral John King, was lying in his cabin, the Royal George went down at Spithead, and nearly 1000 lives were lost. Charles Dickens was born at 387 Mile End Terrace, Commercial Road, Portsea; and other worthies of Portsmouth have been Walter Besant, the younger Brunel, Jonas Hanway, Sir Frederick Madden, George Meredith, and John Pounds.

See L. Allen's History of Portsmouth (1817), II. Slight's Chronicles of Portsmouth (1828), H. P. Wright's Story of the 'Doune Del' or Garrison Church (1873), W. H. Saunders' Annals of Portsmouth (1888), and Murrell and East's Extracts from Portsmouth Records (1884).

Portsmouth, (1) the metropolis and only seaport of New Hampshire, is on the south bank of the Piscataqua River, which flows from the Atlantic, and 57 miles by rail NNE. of Boston. Built on a beautiful peninsula, overlooking a capacious and deep harbour, with smooth rock bottom, it is a handsome old town, many of its streets lined with sable trees, and is a favourite summer-resort. It has a custom-house, and some shipbuilding is still carried on; the manufactures include cotton, hosiery, shoes, tin-castings, and beer. At Kittery, on an island opposite, is a United States navy-yard, with large ship-houses and a floating balance-dock, 350 feet long by 105 wide, with twenty-four pumps. Portsmouth was settled in 1623, and was capital of the state till 1807. Pop. (1900) 10,637.—(2) Capital of Scioto county, Ohio, stands among hills in an iron region, on the Ohio River, at the mouth of the Scioto, and at the southern minis of the Ohio Canal, 106 miles by rail ESE. of Cincinnati. It has several iron-foundries, rolling-mills, stone-mills, and sawmills, and manufactures stoves, nails, steel springs, furniture, machinery, boots, &c. Pop. (1900) 17,570.—(3) A city and port of Virginia, on the Elizabeth River, opposite Norfolk. Gosport, with its navy-yard, &c. (see Norfolk), is a suburb. Portsmouth contains a dry-dock and a naval hospital, and exports naval stores, iron, lumber, cotton, and early vegetables for the north. Formerly a part of Albemarle county, it is now independent. Pop. (1900) 17,427.

Portsmouth, DUCHESS OF. See CHARLES II.

Port Townsend, capital of Jefferson county, Washington, is on Puget Sound, near Juan de Fuca Strait, 42 miles NNW. of Seattle. It has a good harbour, and is an important United States customs station; it is of great strategic importance, and is well fortified. The industries include shops, foundries, &c. Pop. (1900) 3434.

Portugal, a kingdom of Europe, on the west side of the Iberian Peninsula, stretches 350 miles between 36° 59' and 42° 8' N. lat., and varies in width from 70 to 140 miles between 6° 10' and 9° 31' W. long. Its eastern and northern boundaries are Spain, its western and southern the Atlantic
Ocean. Details of provincial areas and populations are given in the subjoined table.

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in sq. m</th>
<th>Pop. (1890)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minho</td>
<td>3027</td>
<td>1,091,990</td>
</tr>
<tr>
<td>Trás-os-Montes</td>
<td>2421</td>
<td>416,090</td>
</tr>
<tr>
<td>Beira</td>
<td>1,828</td>
<td>1,038,250</td>
</tr>
<tr>
<td>Estremadura</td>
<td>6170</td>
<td>388,315</td>
</tr>
<tr>
<td>Alentejo</td>
<td>3578</td>
<td>223,822</td>
</tr>
<tr>
<td>Algarve</td>
<td>2203</td>
<td>2203</td>
</tr>
<tr>
<td>Azores</td>
<td>1,572</td>
<td>235,554</td>
</tr>
<tr>
<td>Madeira</td>
<td>315</td>
<td>134,040</td>
</tr>
<tr>
<td>Total</td>
<td>35,541</td>
<td>5,049,729</td>
</tr>
</tbody>
</table>

The population increases steadily but slowly: in 1851 it numbered 3,487,000; in 1874, 4,160,315; and in 1881, 4,708,178. But fully 16,500 persons emigrate every year, the majority going to America, chiefly to Brazil.

**Physical Aspects.** In respect of its physical structure and conformation, Portugal forms an integral part of the Iberian Peninsula (see Spain). The coast is low and flat, and sandy, except for one or two short distances, as immediately north and south of the mouth of the Tagus, at Cape St. Vincent in the extreme south-west. The two northern provinces are diversified by spurs (5000 feet) of the mountains of Spanish Galicia. The most important mountain-range of Portugal is the Sierra da Estrela (6540 feet), a westward continuation of the Sierra Guadarrama system. The Sierra Morena is continued westwards in southern Portugal. In like manner, the principal rivers of the country—the Guadiana in the south, the Tagus in the centre, and the Douro and Minho in the north—are simply the lower courses of what are geographically Spaniard rivers. The Mondego, which reaches the sea about half-way between the Tagus mouth and that of the Douro, is the longest river that has its sources in the country. Portugal has numerous mineral springs, a large proportion being impregnated with sulphur. Minerals exist in fairly rich abundance, but are not worked to the extent they could be, chiefly from want of fuel and cheap means of transit. Salt is prepared in large quantities in the salt marshes; copper, iron, lead, manganese, antimony, gypsum, lime, and marble are extractable and in part exported. About 5000 persons are all engaged in mining, the yield of which reaches the total value of £224,000 per annum.

**Climate.** The vicinity to the ocean tempers the climate of Portugal, and exempts it from the dry heat of the interior. When viewed from the surface, however, diversities of climate; for, while snow falls abundantly on the mountains in the northern provinces, it is never seen in the lowlands of the southern districts, where spring begins with the new year and harvest is over by midsummer. Rain falls abundantly all the year round, especially on the coast, and from October to March. As a general rule, the climate is healthy in the elevated districts, even of the southern provinces; but malaria and fever prevail in the low flat lands and near the salt marshes. The mean temperature ranges from 60° F. at Oporto to 63° 5 at Lagos on the south coast.

The animal life and plant life do not differ from those of Spain (q.v.).

**Occupations.** The soil is generally rich, except in the arid parts; but agriculture is every- where in a backward state, having more than an half of the area of the country being put to profitable use. Arable land occupies only 51½ per cent.; grass-land, 24 per cent.; orchards, 7 per cent.; forest, 3 per cent.; vineyards, 2½; and olive-groves, about the same. The principal crops are: maize, wheat, rye, barley, and rice, but not in sufficient quantity for the wants of the people. Potatoes, vegetables (especially onions), flax, fruits (oranges, lemons, chestnuts, almonds, &c.) are grown in large quantities. But the cultivation of the vine and of the olive are the most prosperous branches of industry; from the former is derived the rich red wine familiarly known as Port, from the latter the magnificent olive oil of the port. The total quantity of wine annually produced in Portugal amounts to 88,000,000 gallons. Cattle are reared in the north, sheep and goats in the centre, and swine in the oak forests of the south. In the vine districts of the north and centre the hay is mostly exported to London and English proriers; in other parts of the country great estates are owned by the nobles and let to tenants to cultivate. The rearing of silkworms and the keeping of bees is pursued with some energy. Fish is abundant in all the rivers and off the coasts. Tunny and sardines are exported; and late attention has been given to the rearing of oysters.

**Commerce.**—Portugal is not a manufacturing country; what industry there is is principally concentrated in the two chief towns, Lisbon and Oporto. In all, some 91,000 persons are engaged in industrial pursuits, and of these nearly a quarter are employed in weaving wool. The rest cut cork, manufacture cotton, linen, silk, leather, glass and porcelain, paper, and gold and silver filigree, and carry on various other industries. In 1889 the imports amounted in value to £1,200,000, of which the principal items were iron and steel vessels (43 steam), measuring in all 77,996 tons. During the four years ending 1887 the Portuguese ports were entered by an average of 5565 ocean-going vessels of 3,404,500 tons, but in 1893 by 5,793,000 tons of these, nearly half in number and more than half in tonnage were British. In 1893, 1430 miles of railway were open, and 300 more in course of construction. The exports, consisting principally of wine, copper, salt, cork, fish, oxen, fruits, vegetables, and wool, average 4½ millions sterling in value annually. More than one-half of this total is for wine, the value of which ranging between £1,580,200 (in 1879) and £2,751,770 (in 1886). Of this again the greater part is for port wine, exported to Britain, 3 to 4 million gallons annually, valued at 1 to 1½ million sterling; and to Brazil, to an annual average of £268,000. France takes every year about 400,000 cases of wine, the common wine of the country. The value of all the exports sent to Great Britain every year ranges from 2½ to nearly 4 millions sterling. Apart from wine, the principal items are cork, copper, salt, wool, and five other imports. Portugal's imports chiefly cottons (1½ to 2 million sterling), woollens, coal, metals, machinery, and butter, to the annual value of 1½ to 2½ millions sterling. Her total imports, which, in addition to the articles mentioned, embrace bullion, flour and wheat (more than £1,000,000 annually), glass, live-stock, silk, timber, linen, &c., reached the value of 11½ millions in 1889, a steady increase from 7½ millions in 1885. Germany, France, and the United States rank next after Great Britain as sources whence Portugal draws her imports.

**Finance.**—Many of her commercial prosperity, Portugal cuts a bad figure in her financial arrangements. For years there has been an annual deficit, which is mostly met by loans, so that the national debt is rapidly increasing. Whereas in 1878 the national income was £3,973,000, the expenditure was £7,089,000, whereas in 1887 the income had increased to £8,468,000, but the expenditure was £16,000,000. The national debt has increased from £20,974,000 in 1856 to £64,333,000 in 1871, and £149,406,105 in 1892, besides £4,784,777 of floating debt. This interest for the country's loans is accordingly some £5,000,000, by a long way the heaviest item in the national expenditure.

**Defence.**—Every Portuguese above twenty-one
years of age is liable for service in the army. Twelve years is the period of service, three years with the colours and nine in the reserve. On the footnote the army embraces in all about 33,000 800,000; of whom about 150,000 men of all arms. The fleet consists of 1 Ironclad, 10 corvettes and screw-steamers, 21 gunboats and transports, 5 torpedo boats, 13 sailing-vessels, and 7 training and coast-guard ships, the whole manned by 250 sailors and 250 officers.

Religion. Education. — The state religion is that of the Church of Rome, but toleration is extended to all other creeds. There are three ecclesiastical provinces presided over by the Cardinal Patriarch of Lisbon, the Archbishop of Braga, who is primate of the kingdom, and the Archbishop of Evora; these dignitaries rule over fourteen bishops. Ten monasteries were dissolved in 1834, their properties, yielding about one million sterling annually, being appropriated by the state. Education is superintended by a council, at the head of which is the minister of the interior, and is entirely free from the supervision and control of the church. Compulsory education was enacted in 1844, but is far from being fully enforced, consequently Portugal lags behind in education and general intelligence. There are nearly 4000 elementary schools, with about 900 schools for girls, and numerous private schools; polytechnic academies at Lisbon and Oporto; and clerical, medical, agricultural, naval, and military training-schools. The one university at Coimbra (1530), one of the oldest in Europe, has five faculties, 75 professors, and about 900 students. Schools for training in the industrial arts are in great favour; there are 28 in the country, headed by larger institutes at Lisbon and Oporto. Lisbon has a learned society (the Academy of Sciences), and a public library (1766) of 260,000 volumes. There are other libraries at Coimbra (1581) with 14,000 vols., and at Oporto (1833), with 100,000 vols.

Constitution. — Portugal is a constitutional monarchy, the crown being hereditary alike in the female and the male line. The parliament, or Cortes, consists of the House of Peers and the House of Deputies, the former of 350 members, when the necessary changes have been made, eventually consist of one hundred life members elected by the king and fifty elected indirectly, five by the university and scientific societies and forty-five by popular electors. The House of Deputies consists of two chambers, one for every forty citizens above twenty-one years of age who possess certain qualifications of property or status. Parliament is elected every four years; sessions last three months in the year. The deputies are paid 1 l. a day. The executive is wielded by a cabinet of seven ministers, chosen by the premier (one of the seven), who himself is selected by the king. The departments are Interior, Justice, Public Works, Finance, Marine and Colonies, War, and Foreign Affairs. The sovereign also consults a council of state of more than sixteen members, nominated for life, and generally including ex-ministers and present ministers. Justice is administered by rural magistrates in 146 district courts, in 3 courts of appeal (at Oporto, Lisbon, and Azores), and in the supreme tribunal of the kingdom at Lisbon.

Portugal. The Portuguese are a mixed race, originally Iberian, Basque, and Celtic admixture. Galician blood (derived from the ancient Gallici, presumably Gallic invaders) predominates in the north; Jewish and Arabic blood are strongly present in the centre, and Arabic in the south. The Portuguese differ essentially from their Spanish brethren, but regard with inveterate hatred and jealousy, mainly on account of their past attempts to subvert the independence of Portugal. The opinions of observers differ as to the national traits of the people. They seem, however, to be generally sober, good-natured, obliging, and patriotic, but shiftless and dirty. The women are usually exceeding 100,000; no other town reaches 30,000. Lisbon is the capital, Oporto the centre of the port-wine trade, and the chief town of northern Portugal.

The colonial possessions of Portugal are enumerated in the subjoined list:

<table>
<thead>
<tr>
<th>Area (sq. m.)</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cape Verde Islands</td>
<td>3,450</td>
</tr>
<tr>
<td>Senegambia (Gambia)</td>
<td>26</td>
</tr>
<tr>
<td>St. Thomas and Prince's Island</td>
<td>417</td>
</tr>
<tr>
<td>Ajudia (fort, Guinea Coast)</td>
<td>134</td>
</tr>
<tr>
<td>Angola (embracing the districts of Congo or Ambros, Louga, Benguela, and Mossamedes)</td>
<td>821,000</td>
</tr>
<tr>
<td>Mozambique</td>
<td>1,390,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Area (sq. m.)</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goa (in India)</td>
<td>1,292</td>
</tr>
<tr>
<td>Bug, Damar, &amp;c.</td>
<td>126</td>
</tr>
<tr>
<td>Timor</td>
<td>6,260</td>
</tr>
<tr>
<td>Macao (in China)</td>
<td>44</td>
</tr>
</tbody>
</table>

Total | 4,011,501 | 3,690,384 |

See Crawford, Portugal, Old and New (1850); and Round the Calendar in Portugal (1890); Aldama-Ayala's Compendio; Murray's Handbook; G. B. Loring, A Year in Portugal; and pullman, Journals of a Residence in Portugal (1895); and Maccabees, As Colonies Portugueses (1897).

History. — Romans followed Carthaginians as conquerors (138 B.C.) of the western Iberians and Celts. Under Augustus the peninsula was divided into three provinces, one of which, Lusitania, has, until quite recent times, been regarded as nearly identical with the present kingdom of Portugal; but the Augustan province of Lusitania lay wholly on the south side of the Tagus. The history of Portugal was in early times coincident with that of the Iberian as a whole; and, along with the rest of the peninsula, Portugal was thoroughly Romanised in the days of the empire. After the Romans withdrew, the peninsula was overrun by Visigoths from the north, and at a later period by Saracens from the south. Under Roman, Visigothic, and Saracenic rule, the independent provinces were prosperous and well governed, but became enervated by luxury and unwarlike ease. About the middle of the 11th century northern Portugal fell under the sway of Ferdinand I. of Castile. In 1094 Henry of Burgundy, who had married a natural daughter of Alphonso III., received from that monarch the county of Portugal (from the Minho to the Tagus) as a dependent fief. Under his widow, Theresa (1114-28) the country acquired a sense of national unity and a certain measure of independence. Their son, Alphonso I., made Portugal an independent kingdom (1143)—through the victory of a picked body of Portuguese knights over a picked body of Castilian knights in a tournament—and gained signal advantages over the Arabs, whom he fought for twenty-five years, his greatest exploits being the victory in the plain of Ourique, in Alentejo, in 1139, the capture (with the help of English crusaders) of Lisbon in 1147, and of Alcacer do Sal in 1158. The Burgundian House, which continued in possession of the throne for 440 years, gave to Portugal some of its best kings. Of Alphonso II. and Alphonso III. were engaged in incessant wars against the Moslems and in severe struggles with the clergy and nobles, who were always ready to combine against the sovereign; but, although often baffled in their attempts to uphold the independence of the crown, they maintained the whole, well maintained by the representatives of this family, who were, moreover, distinguished as
the promoters and champions of the maritime glory of Portugal. Sancho (died 1211), the ‘builder of cities,’ especially distinguished himself by his care for the material welfare of his kingdom, and by his encouragement of commerce and the arts. The fairs of Barcelos, Innocent the Third, and that pope’s supporters, the Portuguese bishops. His son, Alfonso II., summoned the first Portuguese Cortes. Alfonso III. (1248-79) conquered the southern province of the kingdom in 1250, and made Portugal what it practically is in area, at the body of its national character. (Deniz) must be regarded as the founder of Portuguese commerce and mercantile enterprise. He likewise encouraged agriculture and the industrial arts, and protected learning, in furtherance of which he founded in 1300 a university at Lisbon, subsequently transferred to Coimbra. Diniz was succeeded in 1325 by his son, Alfonso IV., surmounted the Brave, whose reign was almost wholly occupied in wars with the Castilians and the Moors (see CASTRO,INEZ DE). It was during his reign that the friendly commercial relations with England began. With Alfonso’s grandson, Ferdinand I., the legitimate branch of the Burgundian House became extinct in 1383. After some disturbances Ferdinand’s illegitimate brother, John, was recognised by the Cortes as king in 1383; four months later the able and brilliant John IV. won at Aljubarrota a glorious victory over the Castilians, who had invaded the country. John’s reign (he died in 1433) was eventful, not merely on account of the internal reforms which he introduced, and of his steady maintenance of the prerogatives of the crown, but also on account of the first of those important geographical discoveries and commercial enterprises which made Portugal for a while the greatest maritime power of Europe. During this reign, on May 9, 1386, the treaty of Windsor cemented the firm alliance and national friendship between Portugal and the English, a bond that was further confirmed by the marriage of King John to the daughter of John of Gaunt (1387). To John’s son, Henry the Navigator (died 1460), is due the merit of having organised several voyages of discovery, which culminated in the acquisition of the island of Lagos, and in the occupation of the Guinea and other islands. At this time, too, the slave-trade began, the Portuguese bringing captive negroes to cultivate the large estates of their southern provinces. During the reign of John II. (1481-98), who broke through the walls of Lisbon, Vasco da Gama, in the reign of John’s successor, Manoel, successfully achieved the passage by sea to India, in 1497. The discovery of Brazil (1600), and the settlements made there and on the western coast of India by Albuquerque (q.v.), increased the maritime power and fame of Portugal, which were further extended under Manoel’s son, John III., who ascended the throne in 1521.

At this period Portugal ranked as one of the most powerful monarchies in Europe, and Lisbon, the chief seat of the government of the East, as one of its most important commercial cities. Sudden as this prosperity had been, its decline was almost more abrupt, and may in a great measure be accounted for by the destruction of the old nobility, the extensive emigration that went on to the New World, and, in large measure, of the numerous wealthy and industrious Jews, on whose able financial management the commercial interests of the Portuguese were largely dependent, and the introduction of the Inquisition (1536), and of the Jesuits (1540), whose haughty supremacy gave rise to much tyranny and oppression, both in the colonies and at home, and in various ways stamped out the old spirit of the people, and crippled the resources of the nation. The influence of the Jesuits over John’s grandson, Sebastian (1557), was responsible for the defeat of the Portuguese, and the capture and death of their young king, at the battle of Alcuzar el-Kebir in Africa in 1578. And the influence of the Infanta Dona Leonor, Innocent the Third, and the brief reign of Sebastian’s uncle, Cardinal Henry, plunged the country into difficulties and misfortunes. After a struggle for the throne between half-a-dozen candidates, none of whom found favour with the nation at large—they clung to the delusive hope that Sebastian would rise from the dead—Portugal was freed from the hands of his Moorish captors—Philip II. of Spain succeeded in securing to himself the crown of Portugal and annexing the kingdom to the Spanish monarchy. This involved it in the ruinous wars of Spain against England, in the Low Countries, and in Germany, while the Dutch and English, in retaliation for Spanish aggressions at home, attacked and seized the Portuguese possessions in the Indian Archipelago and in South America. At length the insouciance of Philip IV.’s minister, Olivares, brought matters to a crisis; and in December 1640, after a forced union of sixty years, Portugal was freed, by a bold and successful rising of the nobles, from all connection with Spain, and the Duke of Braganza, a descendant of the old royal family, was placed on the throne (1641), under the guidance of John of Braganza, the King of Portugal, with Spain, which, however, was the natural result of this struggle, turned out under the guidance of the famous Count Schomberg (who fell at the battle of Almena, 1660), and with the assistance of 3000 English troops, favourable to Portugal, and was terminated in 1668 by the treaty of Lisbon, which, by which the independence of Portugal was formally recognised by the Spanish government. But her ancient glory had departed; she had lost many of her colonies, and of those she still retained Brazil alone was prosperous; the nation was steeped in ignorance and bigotry; and the Portuguese, from having been one of the greatest maritime powers of Europe became virtually a commercial dependent, rather than ally, of Great Britain, especially after the Methuen (q.v.) Treaty of 1703. Under the reign of Joseph I. (1750-77) the genius and resolution of the minister Pombal (q.v.) infused temporary vigour into the ailing nation, and arrested the downward tendency of the national credit. But Pombal’s efforts to rouse the people from their sloth, and infuse vigour into the government, were checked by the accession of Joseph’s daughter, Maria, who, with her uncle-husband, Pedro III., allowed themselves to turn back into their old course. The mental alienation of Maria led, in 1799, to the nomination of a regency under her eldest son, John. This prince, who showed considerable capacity in early life, on the outbreak of the war between Spain and France threw himself wholly on the protection of England; and finally, when he learned that Napoleon had determined on the destruction of his dynasty, left Portugal in 1807 and transferred the seat of government to Rio de Janeiro, the capital of Brazil (q.v.).

This act was followed by the occupation and annexation of Portugal by the French—a measure which gave rise to the Peninsula War (q.v.). The victory of Vimeira, gained by the combined English and Portuguese army in 1808, freed the land from its French assailants; and in 1816, on the death of the last Bourbon of Spain, it was ceded to the joint crowns of Portugal and Brazil. But even after the French were driven out of the Peninsula and Napoleon’s power was broken for ever, the new king, John VI., still continued to reside at Rio de Janeiro, and Portugal was governed by English officers, Marshal Bertrand, and thereafter.

This gave occasion to abuses and discontent, which resulted, in 1820, in a revolution at Lisbon, and in the proclamation of a constitutional form of
government, very democratic in spirit, in the place of the pre-existing feudal absoloulion. John hurried to Portugal, and there signed the constitution and ratified the charter of the Senate, whieh he had claimed his son Pedro emperor. On the death of John in 1826, Pedro IV., after organising the government of Portugal on the model of the English parliamentary system, renounced the Portuguese crown in favour of his daughter, Maria da Glória, a child of seven, on condition that she married her uncle, Miguel. The latter, who had availed himself of every opportunity to thwart the liberal policy of his father and brother, waited only for the embarkation of the English troops to break the oath which he had taken to maintain the constitution, and, gathering round him the clergy, the army officers, the old nobility, and all who were in favour of the former order of things, was through their aid declared king by the Cortes in June 1828.

Then ensued a period of indescribable confusion and misrule. At length, in 1832, Pedro was enabled, chiefly by means of a loan from Englishmen, to raise an army, and make a landing at Oporto. Charles Napier virtually destroyed Miguel's fleet off Cape St Vincent in 1833. Shortly afterwards Queen Maria made her entry into Lisbon, and the following year Miguel signed the Convention of Evora, by which he renounced all pretensions to the throne, and agreed to quit Portugal. The death of Pedro in the same year, after he had effected several important reforms, including the reintroduction of the constitution of 1826, proved a heavy misfortune to Portugal, which suffered severely from the mercenary rule of those who occupied places of trust about the person of the young queen. Her marriage, in 1835, with Augustus, Duke of Leuchtenberg, and, after his death at the end of a few months, her marriage with Ferdinand of Saxo-Coburg, were followed by grave political disturbances. A branch of the democrats, known as the Septemberists, from the month in which they made their first decisive stand against the government, loudly demanded (1836) the abrogation of the charter of 1826 (known as the Charter of 1826), and the restoration of the democratic constitution of 1824. This contest of the charters continued through the entire reign of Maria, and party feeling ran so high that it resulted more than once in hostilities. The government of Ferdinand alternately supported by Septemberists and Chartists; one Cortes was dissolved after another; finally, in 1852, a revised charter was drawn up that proved acceptable to all parties. Shortly afterwards the queen died, and her eldest son ascended the throne in 1853 as Pedro V., under the regency of his father. The latter used his power discreetly; and by his judicious management the financial confusions and embarrassments were partially removed.

Upon the sudden death of Pedro in 1861 his brother was proclaimed king as Luis I. He steadily adhered to constitutional principles, and laboured at measures of internal improvement; but ever since the beginning of the century the royal power has been growing weaker and weaker. The financial condition of the country has also grown more difficult, in spite of fairy favourable commerce. The road to the En Gawa powers to appropriate African soil, and divide it amongst them, since the opening of the interior through the Congo, in some degree awoke the old colonial enterprise of the Portuguese, and threatened national pride, and all the more tenaciously to the fragmants of colonial territory still left to them in Afirca. But the welding came too late; the march of events and the energy of her rivals have wrested from her many square miles that she claimed as her own, but had done next to nothing to colonise and peopie, whilst instead of them, Portugal abandoned to their claims to Nyassaland, and two years later a treaty was signed defining the respective spheres of influence of the two countries in East and West Africa, especially in the basin of the Zambezi. Further delimitations were agreed upon in 1891. In the meantime Charles I. had succeeded his father, October 1889. The action of Britain occasioned an outburst of strong popular feeling in Portugal, which the republicans turned to their own advantage; and they were greatly helped by the successful revolution of the republicans in Brazil and the expansion of the empire (November 1889). But in the home country their advantage proved to be of only a temporary nature.

See Morse Stephens, Portugal ('History of Nations' series, 1891); M'Murdo, History of Portugal (1888); Schaefer, Geschichte von Portugal (5 vols. 1856-54); works by the native historians Herceniano (1848-57), Da Silva (1860-71), Coelho (1874), and Da Luz Soriao (1860-82); R. H. Major, Life of Prince Henry of Portugal, translated by Capt. and Lady Samuel; and Caroline (1890); Salisbury, Portugal and Its People (1893).

Language and Literature. — Portuguese, like every other branch of the Romance family of languages, has grown out of a local form of the Lingua Romana Rustica, and in course of time has ingrafted upon it many elements of Arabic from the Saracen invaders, and numerous verbal and idiomatic characteristics of the Frankish and Celtic dialects which were introduced with the Burgundian founders of the monarchy. The earlier forms of Portuguese bore close affinity to Galician; and, although Portuguese presented strong resemblance to its sister-language, the Castilian, in so far as both possessed numerous words of identical origin, it differed so widely from the latter in regard to grammatical structure as almost to merit the designation of an original tongue. The antipathy existing between the Portuguese and Spaniards, and the consequent strenuous efforts of the best Portuguese writers to distinguish their language from the Castilian, and to resist the introduction of further Castilian elements, had the effect of making Portuguese still more dissimilar from the sister-tongues of the peninsula, and the result has been a language that differs from pure Spanish in having a peculiar grace and musical cadence, with a softening or lisping of the consonants, and a deepening of the vowels, which renders it the softest, but feeblest, of all the Romance tongues. The earliest specimens of genuine Portuguese belong to the beginning of the 13th century, and consist for the most part of collections or books of song (see Cancionero), which, both in regard to form and rhythm, resemble the troubadour or minne songs of the same period. Amongst the writers of these the most outstanding figure is King Diniz, who, besides being the forerunner of the Portuguese school of pastoral poets, also drew inspiration from the popular songs of his people. In the 14th and 15th centuries, whilst the romances of chivalry were popular and numerous chronicles were written, the best being that of Fernan Lopes (1380-1459), the court continued to be distinguished by courtly and aristocratic tastes, and the popular poetry was in greater vogue than Portuguese, which was despised by the numerous royal poets who emulated the example of Diniz, and composed love-songs and moral or didactic poems. Under the culture of those noble lands the poets grew more and more bolder, and without the tenderness and pathos which characterised the Spanish verse 'romances' of that age. But the literature of Portugal acquired new vigour...
with the growth of her maritime and commercial prosperity. The Cançãoário Geral (1516) of Garcia de Resende (1470-1554), which gives a general summary and history of the Portuguese poetry of the latter half of the 16th and beginning of the 17th century, is the first evidence of the change, which is most strongly exemplified in the dramas of Gil Vicente (1470-1530), and in the pastorals and eclogues of D. Mendes de Faria (1495-1558), whose dramatic imitations of Horace and Terence mark the transition period between the medieval lyrical and the later classical style. These first attempts at the drama were followed by Antonio de Ferreira's (1323-69) Ignes de Castro, the oldest, and still the finest, Portuguese tragedy. But the classical school, whose chief cultivators were the courtiers of Lisbon and the professors of Coimbra, found little favour among the people at large, whose enthusiasm and patriotism were deeply stirred by the discoveries and conquests of the nation in Asia, Africa, and America. The national pride and glory found expression in the works of Portugal's one really great poet, Camoens (1524-80; q.v.), who, in The Lusiads (1572), struck out a new path in the domain of epic poetry; while his numerous sonnets and dramatic productions exhibit a versatility of genius and graceful tenderness which place him in the foremost rank of European poets. Next after Camoens come the epic poets Corte-Real (1540-93), Mousinho de Quevedo (1540-1614), Pereira de Castro (1571-1628), and Sá de Meneses (1567-1606). To the same period belongs the dramatist Ferreira de Vasconcellos (died 1585).

With Camoens the language and poetry of Portugal reached the culmination point of their development. The Spanish and Portuguese so far lost all feeling of national independence that they at length renounced their native tongue, and adopted the language of their rulers. With the restoration of political independence, under the sway of the House of Braganza, a new school emerged; but the 17th and 18th centuries produced few Portuguese writers who attained more than an ephemeral and purely local reputation—bomast, or slavish imitation of Spanish and Italian writers. Among the principal characteristics of the Portuguese school of light literature, some Good Words belong; however, this period, as Jacinto Freire de Andrade (1597-1657), whose life of Joao de Castro, Vicerey of India, still holds its place as a monument of classical Portuguese prose; the great Indian missionary, the Jesuit Father Antonio Vieira (1608-97); whose sermons and letters are regarded as models of style and diction; De Barros (1496-1570), the historian of The Conquest of the Indies; De Faria e Sousa (1509-1649), De Brito (1509-1617), and Brandão (1534-1604), who wrote Monarquia Universalia; A. de Resende (1498-1529); and F. X. de Menezes (1673-1743). During the 18th century French literary canons and models were slavishly followed by most Portuguese writers of verse, of whom the best known is Da Cruz e Silva (1731-1800). But in the beginning of the 19th century Portuguese poetry was partially elevated from its previous low grade by two men, who, although they professed to observe a strictly classical style, possessed a delicacy of taste, and a general creative power, which saved them from falling into the absurdities that had generally characterised the school in Portugal; the elder of these, F. M. do Nascimento (1734-1819), although specially noted as an elegant lyric poet, deserves notice for his graceful miscellaneous; while Manoel do Boeco (1796-1806), his less cultivated rival and contemporary, must be regarded as the most original and truly national of the modern poets of Portugal. His sonnets rank as the finest in the language, and these, with his numerous idylls, epigrams, and occasional poems, composed in various styles and modes of versification, have had a host of imitators, among the best of whom are the dramatist, J. B. Gomes (died 1803); De Macedo (1761-1831), the epic poet; and the satirist, T. da Almeida (1741-1811). The best of the recent Portuguese poets are A. de Castilho (1800-75) and D'Almeida Garrett (1799-1854). The last named was the most versatile and popular writer of his time in Portugal. Next to them come Herenciano (1810-79), who is also one of Portugal's best historians; Da Silva Mendes Leal; De Lencos, founder of the Coimbra school; Palmeirim, De Passos, De Deus, Braga, and Du Quintal. Other modern writers who deserve mention are the historians De Luz Soriano and Latino Coelho; Branco and Biester, playwrights; the novelists Rebelo da Silva (who ranks after Herenciano as the scientific historian) and De Queiroz; and Lobo (1763-1844), a general man of letters. Portuguese literature is likewise cultivated in Brazil, as well as in late years, with considerable independence and success. The principal names in poetry are F. V. Barroso, De Barros, De Cunha Passos, De Carvalho, Goncalves-da-Cruz, Porto Alegre, M. De Macedo, Teixeira e Souza, and Magalhaens, the most national of them all; in history, Varnhagen, author of the Historia Geral de Brazil, and F. da Silva, author of the Brazilian Plutarch; and the epigrammatist Fonseca.

See T. Braga's Historia da Litteratura Portuguesa (14 vols. 1870-89), his Curso (1886) and his Antologia (1876); F. da Silva and Assunção's Dicionario Bibliográfico Portuguez (12 vols. 1888-89); Buterweck, History of Spanish and Portuguese Literature (Lond. 1823); and French works by P. Bouterwek, and B. L. and E. F. Kugler.
they are much diffused over the world, and are shrubby or herbaceous, generally succulent, mostly growing in dry places. The flowers are often large and showy, but are generally produced in large clusters and are in bloom and insipid. Some species are used as salads and pot-herbs, of which the best known is Purslane (q.v.). The tuberous roots of Cheltonia tuberosa, a Siberian plant, are used for food. The genera Calendrinia and Portulaca furnish some beautiful annuals.

Port Wine (i.e. Porto or Oporto Wine), a species of red wine, hot and heady, which is produced chiefly in a mountainous district of Portugal, called Cima de Douro, and exported from Oporto and Lisbon. The vine from which this wine is produced is generally planted on craggy slopes with a southern exposure. The wine, when pure and unadulterated (which is very seldom the case), does not acquire its full strength and flavour till it has stood for some years, to allow for the disturbance of the spirit to subside, and the antagonistic ingredients of the mixture to harmonise; but care must likewise be taken that it is not allowed to become too old. The colour of new port wine varies from pale rose to deep red, and changes with age, becoming a deep tawny brown, which is permanent. By far the greater portion of the wine is mixed with spirit even during the time of fermentation, in order to give the new wine the ripeness and strength which importers require, and which the wine does not naturally attain till it has stood for some time; the proper colour is also given by a mixture known as rouge, which is a preparation of elder-berries, molasses, raisin-juice, and spirit. It is an exception of this jargon in the inferior sorts of port which communicates to them the medicated colour so frequently noticed. The extreme 'headiness' of port is chiefly due to the liberal admixture with spirit, and this is the amount with all the wines generally exported, which average 35 per cent. of proof spirit. From the time when port came into demand (about 1700, though it was known in England for a considerable time before this) down to 1826 its export was a monopoly in the hands of the English merchants, but at a certain period increased with tolerable steadiness, year after year, till the three years ending 1840, when it reached 34,700 pipes of 126 gallons. The ultimate effect of this monopoly of the Oporto Wine Company was to increase the price of port wine in England, and at the same time so to deteriorate its quality that its course of time it became of less demand, and was largely supplanted by southern French and other wines. Since that period it has fluctuated, being sometimes more and sometimes less than this figure; in 1850 the exportation reached 57,457 pipes. Between 1890 and 1895 the exportations from Great Britain ranged from 3,000,000 to 4,000,000 gallons (not all for consumption in that country), and the value from £900,000 to £1,340,000. The natural wine, with less than 26 per cent. of proof spirit, is by law sold uninvigorating. The exports of port wine from Oporto in 1890 were 37,700 pipes valued at £1,471,000, but in the years 1880-97 decreased considerably on the whole.

Porns. See Alexander the Great.

Poscharszewatz. See Passarowitz.

Poseidon. See Neptune.

Posen (Polish Poznan), a province of Prussia, bounded N. by West Prussia, E. by Poland, S. by Silesia, and W. by Brandenburg. Area, 11,178 sq. m. The Warthegau owes its existence to a waterland, which, navigable throughout the greater part of the

are several lakes in the east. Like Pomerania, it is essentially an agricultural province, nearly 62 per cent. of the area being arable land, 13 per cent. woodland, 20 per cent. meadow and pasture. More than 55 per cent. of the total is in the hands of large landed proprietors (see also Mecklenburg). Grain, potatoes, and hops are the principal products. The industry is not much developed, being limited chiefly to machinery, cloth, bricks, sugar, and beer. Pop. (1890) 1,751,412; of whom 889,000 are Poles, mostly in the rural districts, 725,000 Germans, principally in the towns, and 51,000 Jews. There is a Roman Catholic archbishop of Gnesen and Posen. The chief towns are Posen (the capital), Gnesen, Bromberg, Lissa, and Rawisch. Posen formed an integral part of Poland till 1772, when, at the first partition, the districts north of the Netze were given to Prussia; to these were added in 1793 Great Poland, except Masovia, the whole being incorporated under the name of South Prussia. In 1807 Posen was included in the duchy of Warsaw; but by the Congress of Vienna it was re-assigned to Prussia under the title of the Grand-duchy of Posen. In 1848 the Poles gave the Prussian government considerable trouble. See History by Chr. Meyer (1881).

Posen, the chief town of the province, and a fortress of the Holy Roman Empire (1827-53), is situated 160 miles south-west of Warthe, 158 miles by rail E. of Berlin. One of the most ancient cities of Poland, it became the seat of a Christian bishop in 908, and it was the capital of the early Polish dukes. In the 17th century it was an important trading mart, but by the end of the same century had begun to decline. Recent improvements have rendered it one of the most pleasant towns in Prussia; it has regularly built streets and squares and handsome suburbs. The fortifications have been strengthened by detached forts built in 1876-84. The cathedral, a Gothic pile dating from 1377, has attached to it the 'Golden Chapel' of Count Raczyński, which is adorned with valuable treasures and works of art. The principal secular buildings are the town-house (1508), containing valuable archives; the Raczyński Palace, with a library; the Działynski Palace, both are built in the Renaissance style. Posen is a provincial museum of antiquities. The chief manufactures are artificial wools, agricultural implements, furniture, carriages, &c.; and there are likewise several breweries, distilleries, and flour-mills. Pop. (1875) 60,988; (1890) 69,627, about one-half urban and 355 urban bulls. It is the chief Jewish city, though the Jews number nearly 7000. See Histories by Lukaszewicz (1881) and Uhlschläger (1886).

Posidonia. See Pecten.

Posidonius, a Stoic philosopher, born at Apaneia, in Syria, about 135 B.C., who studied at Athens, and settled at Rhodes, whence in 86 he was sent as envoy to Rome. Here he became intimate with Cicero, Quintus Pomponius, and other illustrious Romans. He died at the age of eighty-four, leaving works on philosophy, astronomy, and history, of which only fragments have been preserved.

Posilipo (from a villa here called Pastrisipon, 'Pausa-sound,' which at one time belonged to the Emperor Augustus), a mountain on the north-west of Naples, opposite the city of the same name. It is the site of an old noble site for the villa of wealthy citizens. It is remarkable for the tunnel known as the Grotto of Posilipo, through which the road from Naples to Pozzoni (anc. Puteoli) passes. The grotto varies in height from 20 feet to 80 or more, is 20 to 30 feet wide, and 135 yards long. It is traditionally said to have been made in the reign of Augustus, but is probably earlier. Above the eastern entrance of the grotto is the so-called
POSITIVISM

1. Tomb of Virgil. At the base of the hill anciently stood the poet’s villa. During the middle ages the common people believed the grotto to be the dwelling of the poet, whom they regarded as a great magician. Two other tunnels were bored from the hill, one to the north of the grotto, 800 yards long, 39 feet high, and 33 feet broad, made for the tramway, and another constructed at the command of Agrippa in 37 b.c., but only discovered in 1818.

2. Positivism, the System of Thought and Life founded by Auguste Comte (1798-1857; s.v.), is defined by him as consisting essentially of a ‘philosophy and a polity which can never be dissevered; the former being the basis, and the latter the end, of one comprehensive system, in which our intellectual faculties and our social sympathies are brought into close correlation with each other.’ He chose the word Positive on the ground of its indicating the reality and constructive tendency which he claimed for the doctrine in its theoretical aspect, while he anticipated that in the future the term would acquire a wider meaning by suggesting also similar ideas in the sphere of feeling and action. The two primary characteristics of Positivism, the philosophy and the polity, were finally welded into a whole under the conception of a religion, which has for its creed the new synthesis established by the one, and for its moral law the social reorganisation proposed by the other. We may best consider Positivism under these three aspects.

3. Positive Philosophy.—Comte’s primary aim was to put an end to the intellectual and social anarchy which had resulted from the destructive criticism and the revolution and to show the way out by supplying an interpretation of phenomena which should organise our knowledge of the world, of man, of society, into a consistent whole. Such a universal synthesis must the new philosophy provide in form, for the titanic task of a new art of life.

4. Historical analysis revealed to Comte, as a law of mental growth, the progress of all human conceptions through three distinct phases. The primitive stage he called the theological; the transition stage, the metaphysical; and the final stage, the positive stage. These three general terms in the restricted sense of the words are most concisely explained by Stuart Mill’s translation of them into volitional, abstractational, experiential. The transition was effected by the gradual acceptance of the scientific method of induction from observation of phenomena as the only sound basis of the solution of all problems, whether other than phenomenal being finally given up as fruitless. Science, therefore, is the instrument capable of effecting the desired unity; and the problem of the positive philosophy is a threefold one: (1) to bring all knowledge within the sphere of scientific investigation; (2) to extend scientific methods through the whole territory of each division; (3) to co-ordinate the results obtained from the separate sciences; so as to approach an expression of all our knowledge in terms of a single doctrine. All these parts of this problem Comte considered to be in a demonstrative degree solved by his Classification of the Sciences.

5. He observed that the several classes of conceptions advanced from the theological to the positive stage with different degrees of facility, and on investigating the causes of these progressions, he found that the order of emancipation of the various sciences was determined by the degree of complexity and the consequent relations of dependence. A preliminary distinction was made between the abstract and the concrete sciences, the former treating of the general and the latter of the special, by the phenomena of any class, and the latter depending on these and treating of definite objects under the several aspects in which they may be viewed. The concrete sciences, Comte considered, did not yet admit of co-ordination, and he confined his classification to the abstract sciences, which he placed in the following series: (1) Mathematics; (2) Astronomy; (3) Physics; (4) Chemistry; (5) Biology; each of these classes dividing the preceding science, and adding a new order of conceptions peculiar to itself. This series he found coincident with the sphere of knowledge then supposed to admit of scientific treatment. But there remained his phenomena of society, forming a wide field of inquiry to which positive methods had never yet been applied. Certain tentative efforts had indeed been made to construct a so-called science of history—notably by Montesquieu and Condorcet—but no one before Comte had formulated the principles on which such a task might be accomplished. By his discovery of the methods proper to a rational study of social phenomena, and by his dicta—that owing to the complexity of the conditions involved, the laws of such phenomena cannot be determined a priori, but must be inductively observed, and afterwards verified and co-ordinated by deductive application of the general laws of life; that the statistical condition of each historical period must be viewed in its totality, as determined by the interaction of the various classes of social factors; that intellectual evolution affords the true measure of development; and that the evolution of these and other doctrines Sociology was created and established in the hierarchy as the last and crowning science of the series.

6. The whole realm of fact was now included in the domain of positive inquiry, and Comte next addressed himself to the inquiry of the separate departments of knowledge. In the earlier portion of this task his mathematical aptitude ensured him a large measure of success; while in biology he paved the way for further developments by his organisation of the materials then available. His main services, however, in scientific co-ordination were in the department of sociology. Besides the formal constitution which he gave to the new science, his chief substantive contribution was his enunciation of the fundamental law of intellectual development, which all his other theories served to illustrate. His cardinal doctrine of the positive philosophy. The process of thought, moreover, from theological to positive conceptions was shown to be coincident with a progression in social action from an aggressive militarism, through a period of defensive attitude, to the first regime of industrialism. The series of transitions in which, as in the series of transitions of all sciences, our increasing knowledge of the conditions of our existence and our systematic efforts to modify them, are mutually and necessarily dependent, our increasing knowledge of the conditions of our existence and our systematic efforts to modify them, are naturally reacting on each other.

7. The main problem of the positive philosophy, the unification of knowledge, was not yet ripe for its final solution in the days of Comte, but his classification of the sciences is regarded by his followers as affording an admirable framework for the theory of evolution advanced at a later date with the claim of supplying this want. Comte was fain to be content with the partial solution of a sublime unity in the suberviance of all the sciences to the needs of man.

8. Positive Polity.—On the basis of the philosophy he had thus established Comte founded a scheme for the regeneration of society. The ethical portion he did not live to complete, but in his elaborate exposition of the art of social politics we have ample insight into his views on what he considered an integral part of his system. We have space here only for a bare outline.

9. The true measure of man’s life must be that which rests on the fullest knowledge. We naturally strive to improve those conditions of our existence which we can affect in the direction indicated by the clearer
POSITIVISM

light of a new synthesis. What, then, are the evils or imperfections of our lot which may be remedied by positivity? Positivism, throughout, its laws are wholly beyond our direct influence, and we can only to a limited extent affect the conditions of their action. But in the science of man we ourselves are the factors, and our efforts to modify our environment form the subjective aspect of Positivism, if we most correctly consider, a law of social development.

Comte believed the first requisite of systematic action to be the recognition of a central intellectual and moral authority dissociated from practical politics, which he proposed to secure by organizing a Spiritual Power, consisting of promoters, supported by the state. This class, exerting a purely moral control, yet supreme in all affairs of private and social life in virtue of its natural prestige, would have only an indirect influence on political action. The temporal power should be in the hands of capitalists, the captains of industry—i.e., in their own order and naming their successors—who would feel a moral responsibility to the spiritual power, especially when the authority of the thinkers should be strengthened by the support of women and of the working classes, whose ready adherence to positive principles Comte firmly anticipated. Besides the corrective influence of each of these powers on the other, an efficient check on despotic control on the part of either is provided in the perfect freedom of opinion and expression allowed—a freedom the more valuable that it would rest on a system of scientific and moral education, which it would be one of the chief functions of the spiritual power to direct and enforce.

With the decline of militarism and the growth of industrialism Comte foresaw that political action would in the future be mainly directed on the organization of labour for the benefit of society at large. No idleness would be permitted; all would be workers. The distinction between the capitalists and the workmen, the rich and the relatively poor, would remain; but the former would be taught to hold their wealth as a trust from society to be used for the benefit of all, while the latter would also come to regard themselves as performing public functions, serving society each in his place. These views are substantially similar to such more recent economic teaching as that of Carlyle and Ruskin in Great Britain.

In the sphere of morals the main office of the spiritual power would be to strengthen the social tendencies of man at the expense of the personal, a process made possible by the development of the affections originally called forth in family life. In the sphere of intellect it should regulate and concentrate the labours of its members, putting an end to the present ‘dispersive speciality’ of scientific aims, and determining the direction of all intellectual efforts by reference to social needs. In this constructive and constructive sphere of Positivism Comte applies these general doctrines to the immediate future, by propounding a scheme of concerted action for a great Western Republic, embracing the French, English, German, Italian, and Spanish nations—an organization imperfectly expressed by the influence of Faddism and Christian

Positivist Religion.—Such are the creed and the practice of Positivism. But a religion is more than creed and practice; there must be a sentiment, an appeal to the heart, a satisfaction of the feelings. The positive is subjective, it is a reaction reverted, proposed by Comte to succeed the idea of a Deity (whose existence he considered impossible either to affirm or deny) is that of Humanity, regarded as a collective unity, a great being, consisting of all the men and women past, present, and to come, whose lives have been or shall be devoted to the best-being and for the best of humanity. To this partly ideal yet wholly real, capable of being definitely conceived, and not beyond the reach of our services, would gather round it all our affections for our fellow-men; gratitude and reverence for those who have struggled and achieved in the past have made us what we are; love and sympathy for all round us who are striving after better things; hope and effort for the more perfect life of those yet unborn. Comte looked on the religion of Humanity as fulfilling all the highest aims sought by the religions of the past, and especially as the generalization of the ethical of Christianity, the historical value of which he thoroughly appreciated as a transitional phase of religious development. The worship of Humanity was to consist in prayer, taking the form of high resolve and profound communion with the noble spirits among the dead, and in public commemorations, for the observance of which a calendar was suggested, associating each day of the year with some great name in the roll of mankind, and arranged so as to illustrate the course of human history. Positivism would carry on the traditions of the priesthoods of former religions, preaching self-abnegation as the rule of life that brings the highest happiness, and offering no reward, save a place in the ‘cloud invisible’ of the great and good, whose names are cherished in the hearts of those who follow them, and whose influence will live to the end of time.

Positivism is of too recent origin to be adequately treated except in an account of its genesis, and the above outline of the system has therefore been entirely confined to that of this life; the secret activities attached to himself a body of disciples more remarkable for intellectual eminence than for numbers. The most prominent of these was M. Liétré (q.v.), who afterwards edited his master’s works, and established a review with the title of La Philosophie Positive. His discipleship, however, did not extend to the later developments of the system. Near the end of his life Comte founded the Positivist Society, an organization which still has its headquarters in Paris. Among the best known of its members are Mr. Frederic Harrison, Dr. Bridges, and Professor Decury, who have translated Comte’s chief works and have published many expository and illustrative papers and addresses. There are two centres of Positivist activity in London, each with connections in other large towns. One of these, which is presided over by Mr. Congreve, has introduced more of a ritual into its services; while the best-known group, associated chiefly with the name of Mr. Frederic Harrison, and having its headquarters at Newton Hall, Fetter Lane, devotes itself mainly to extending a knowledge of the system by public addresses and various forms of practical effort.

Among sympathetic critics of Positivism are many thinkers of eminence imbued with the positive spirit, and more or less indebted to the genius of Comte. Stuart Mill, in his work Auguste Comte and Positivism (1865), though taking an independent standpoint, speaks in terms of high appreciation not only of the leading doctrines of the positive philosophy, but also of the conception of Humanity as a great and wonderful keystone of the new religion. Many of the details of ritual and worship, however, were repugnant to him, as they have proved to many; and, while exaggerating the importance of the Conscience, he makes no allusion to the connection between the earlier and the later portions of Comte’s career. His book should be read along with Dr. Bridges’ reply, entitled The Unity of Comte’s Life and Doctrines (1865). Mr. Spenner in his Life of Comte vindicates his independence of Comte than to acknowledge his obligation to him. His references to his great predecessor mostly concern their disagreements. In
two essays, one on The Genesis of Science and the other on The Classification of the Sciences, he opposes Comte's views on these subjects; and he has even thought it worth while to write a second edition of his Essay on the Development of the Philosophy of M. Comte. Mr Spencer's exposition of the theory of evolution is regarded by Positivists as a valuable contribution to that scientific philosophy, the aim of which is for the benefit of mankind.

G. H. Lewes, in the chapter on Comte in his History of Philosophy, calls him the greatest thinker of modern times, and declares himself an ardent adherent of Positivism. For this reason, however, Lewes' feeling is one of partial sympathy only. In George Eliot's works the influence of Comte's doctrines is evident, and she has devoted one of her novels to the annihilation of Intelligentism and religion, an issue in which Comte and Lewes found themselves linked. In Lewes' view, the scientific spirit can only be fostered by a religious idea, and he has devoted a whole number to the subject.

In theologick alae. Britain possession, distinguished the man the ownership article Dr. Later scientific added what most interest reversion the. enacting, enforcing them the resistance, raising him. physicians, of tivism', sympathy Positivism, History of. Comte's Ency. Brit.; Professor Edward Card, Social Philo-

sophy and Religion of Comte; Dr J. M'Cosh, Christian-

ity and Positivism; Dr Martineau, in Types of Ethical Theory; Professor Huxley, 'Scientific Aspects of Posi-
tivism,' in Lay Sermons; and Mr A. J. Balfour, Religion of Human-

ity. Among critics wholly antagonistic to Positivism are naturally to be found the theologians, the so-called metaphysicians—i.e. all whose explanations of phenomena either assume the action of supernatural beings or are expressed in terms of abstractions such as vital principle, intuition. But Comte still evaded all such interpretations of his system; he professed merely to express his general conceptions, and leaves them open to theological and metaphysical influences beyond the immediate sphere of their own speciality. The opposition of these classes follows from the refusal of the latter to accept the modern recognised modes of thought to other than an historical importance.

Posse Comitatus ('the posse of the county', the infinitive 'to be able' being used in late Latin a noun, and meaning power or force), the whole force of the county, consisting of knights and men above the age of fifteen, with constables, who attend the orders of the sheriff to assist in enforcing process or quelling riots. Justices of the peace can also, if apprehensive of an organised resistance, command the services of the posse comitatus, and it is the sheriff's duty to raise the necessary number of men. But practically, in modern times and specially in large cities, they have all the assistance given or required. See SHERIFF.

Possession is the relation which subsists between a person and a thing, when the person has control over the thing, and maintains his control with the intention of exercising rights over the thing. A man may be in possession of what is not his own; a thief enters into unlawful possession of another's goods; a farmer has lawful posses-
sion of his landlord's property. Again, a man may own a thing without possessing it, and the law prescribes the forms of action, &c. whereby an owner may recover possession of his property. In a reasonably well-governed community possession is evidence of right to possess; the person in possession is therefore protected against all the world, unless there is some other person who can show that he has a better title: this is what is meant by saying 'possession is nine points of the law.' To speak sometimes of an interest in possession, as distinguished from an interest in reversion or remainder: thus, the person who is entitled to receive the rent of land has an inter-

est or estate in possession, though he does not possess the land. In common speech possession is frequently used for a right; for instance, legal purposes the two ideas must be carefully distinguished. See Hunter's Roman Law; and Pollock and Wright's Essay on Possession in the

Common Law (1888). There may be joint-ownership in either personal or real property, one of the characteristics of this kind of ownership being 'benefit of survivorship'—i.e. if one of the joint-

owners dies his interest accrues to the other, and does not pass to the deceased's heirs or representatives. In partnership, when one partner dies his share belongs to his own personal rep-


Possession, DEMONIA. See DEMONOLOGY, EXORCISM.

Posset, a dietetic preparation, made by curd-

ing milk with some acidulums liquor, such as wine, rose-water, white wine, vinegar, or lemon-juice. The posset is often preferred, but sometimes old ale is used. The milk is boiled, and whilst it is still on the fire the aci-
dulous matter is added; if sherry, about a wine-
glassful and a half to the pint of new milk is the proportion, or twice the quantity if ale. A tea-

spoonful of vinegar or of lemon-juice is sometimes used instead; one or two tablespoonsfuls of treacle may be added, to sweeten. Taken at bedtime, it is used for colds and coughs.

Post-capitain. See CAPTAIN (Naval).

Postglacial and Recent System. The deposits belonging to this system contain the remains of plants and animals, few of which are very abundant. The most important animal remains are those of the great mammals, being the oldest of the large herbivors, and the most ancient of the Flora and Fauna of the Neolithic Age, and the postglacial or recent period.

The flora and fauna of the period are essentially the same as at present. In the earlier stages of the period, however, the flora of north Germany, Denmark, southern Sweden, &c. was arctic-alpine, and that flora was accompanied by the northern mammals, including the reindeer, &c. Later in the period, as the climate became more genial, the northern flora and fauna disappeared from the low grounds of north Europe, and the flora and fauna of the more southern and genial parts of Europe took their place. Of the more notable mammals of the period in Britain were Megaceros (Irish deer), Bos primigenius, and Bos longifrons. The oldest traces of man met with at this stage belong to the Neolithic period.

Several geographical and climatic changes appear to have supervened in postglacial and recent times. After the Scandinavian flora and fauna had been succeeded in our area by the present assemblage of plants and animals, the climate appears to have become even more genial than it is in our day. The vegetation of the period by which these trees do not now grow, and reached elevations on the mountains which they cannot now attain. At the same time many southern types of molluscs
migrated into northern seas, some of which have since died out, or still survive in diminished numbers and dwarfed in size. To this genial stage belonging in invaded, the former low-lying, the lower buried forests of the bogs. Eventually the climate changed and became wet and cold. The British area, formerly continental, was insulated and of less extent than now—the sea overflowing the low ground of Scotland up to a height of 50 to 60 feet level. The vegetation pacers that made their appearance in many mountain-gleams, and these areas the place where the 'carse-clays' (45-50 feet terrace) belong to this stage. The climate was not so favorable for the growth of great trees, which were more restricted in their vertical and horizontal range. Over wide areas the forests decayed and became buried by mosses and their allies. The general occurrence throughout north-western Europe of a second well-marked 'buried forest' seems to indicate a return to more genial climatic conditions, giving rise to a second period of great forests, which gradually overspread much of the moory and waste lands. Coincident with this second forest-epoch there appears to have been a gain of land, at least in Scotland, but there is no evidence to show that Britain again became continuous. The second forest epoch was succeeded by one that first had been by somewhat cold and wet conditions, under the influence of which the forests decayed, while swamps and morasses increased. At the same time the Scottish area became depressed for some 25 feet or thereabout below its present level. The last physical change of which there is clear evidence is the final retreat of the sea, while the general aspect of the bogs (in which the rate of decay exceeds that of growth) would seem to indicate that we are living under drier conditions than obtained when the second forest-epoch came to a close. See EUROPE, STONE AGE.

Post-horn. See HORN.

Posting, the forwarding of passengers from place to place by means of relays of horses. Posting was long in Britain, as it is yet in some parts of the Continent, a government monopoly. See POST-OFFICE.

Post-mortem Examination. Examination of the body after death is a duty which has frequently to be discharged by medical men in various circumstances, of which the most important are: (1) cases of sudden or accidental death; (2) cases of lingering illness, in which the nature of the disease had not been determined during life; and (3) cases of suspected suicide or homicide. Such examinations cannot legally be undertaken until twenty-four hours have elapsed after death, and permission or warrant must be obtained for the performance of the examination. In ordinary cases where the examination is necessary or advisable for the purpose of throwing light upon the nature of the fatal illness, and where no judicial question is involved, the presence of the parents, relatives, or guardians must be procured. In medico-legal cases the order of the coroner (in England) or of the procurator-fiscal (in Scotland) is essential. In such cases the examination should always be performed by two medical men, one of whom is desired to be an expert. In all cases the position of the body and of the surrounding objects should be carefully noted, as they often throw light upon the cause of death. The external appearances of the body, such as the presence of rigidity and of post-mortem changes, should be observed, as affording a certain indication of the period at which death occurred. In medico-legal cases every organ in the body should be carefully examined, and its condition briefly but accurately noted. A careful microscopic examination should follow if there be the least doubt as to the nature of the disease condition present. Finally, in cases of suspected suicide or homicide, the body should be subjected to chemical analysis. The study of the changes wrought in the various organs by disease has been one of the most potent factors in advancing scientific medicine.

Post-nuptial Contract. See HUSBAND AND WIFE, SETTLEMENT.

Post-obit (Lat. post obitum, 'after death') is a bond of security given by heirs and others entitled to reversionary interest, whereby, in consideration of a sum of money presently advanced, the debtor binds himself to pay a much larger sum after the death of some person, or of himself. Whenever, as is not unusual, the payment is uncertain, and depends on the obligee outliving somebody else, very high interest is required, or rather a very much larger sum is agreed to be repaid than what is advanced. These are generally usurious bargains; but the obligee or creditor can enforce payment of the full amount; though, if there is a great excess of inadequacy in the proportions amounting to fraud, a court may consider it void.

Post-office. (1) A government department whose chief business it is to convey letters from place to place; and (2) any office or agency appointed by that department for the reception, despatch, or delivery of letters. Although letter conveyance is the primary work of the post-office, many other branches of business have been assumed by it. The word post is derived from the Latin postus, meaning 'placed', 'fixed,' and comes to have its particular application from the posts, or stages, at which on the roads of the Roman empire couriers were maintained for the purpose of conveying news and despatches. Herodotus mentions that a system of couriers existed in the Persian empire; and Xenophon states that post-stations or houses was established by King Cyrus. Marco Polo describes a similar system existing in China in the 13th century, the stations being only three miles apart, thus securing great rapidity of communication. Among the ancient Aztecs in Mexico a complete system of couriers was likewise maintained, the stations being about two leagues apart, and providing a rapid means of communication by foot-messengers. In all these cases the work was done on foot, and the posts so set up for government service only.

The first letter-post in the modern acceptance of the word seems to have been established in the Hanse towns in the early part of the 13th century. A line of letter-posts followed, connecting Austria and Lombardy, in the reign of the Emperor Maximilian, which are said to have been organised by the princes of Thurn and Taxis; and the representatives of the same house established another line of posts from Vienna to Brussels, connecting the most distant parts of the dominions of Charles V. The family of Thurn and Taxis continued to enjoy certain privileges in connection with these posts down to 1807, when they were ceded by treaty to the Prussian state, and have since been assumed by the German empire.

In England in early times both public and private business was conveyed by special messengers only; later on they were frequently conveyed by common carriers plying with their pack-horses. In the reign of Edward I., 'posts' were established where horses could be had for hire by messengers wearing the royal livery; and in the reign of Edward II., a post-station was set up at the period of the war, so that private messengers might travel 'post.' In 1481, when Edward IV. was at war with Scotland, a system of relays of horses was
established in the north (probably from York to Edinburgh) in order to provide the king with the latest news in his camp. This arrangement, however, ceased on the restoration of peace. In 1648 the charge for post-horses impressed for government service was reduced by act of parliament, per mile. Camden mentions the office of 'Master of the Postes' as existing in 1581; but the duties of the 'Master' were probably confined to the supplying of post-horses. The foreign or alien merchants in London established a post office there from London to the outports in the year 1514, appointing their own postmasters; but dissensions occurred among them, and the matter was referred to the government in 1588. At this time also the English merchants complained of unfair treatment by the foreign post; and the consequence was that the government set up a post-office for letters to foreign countries for the benefit of the English merchants. The first inland post was established by Charles I., who in his proclamation of 1633 refers to the uncertainty of communication between England and Scotland. The proclamation thus proceeds: 'Wherefore, he now commands his Post-master of England for foreign parts to settle a running post or two, to run night and day between Edinburgh and London, to go thither and come back again in six days, and to take with them all such papers as shall be directed to the post-town in or near that road.' At the same time by-posts were to be connected with the principal towns lying off the main line of posts. In 1637 a proclamation prohibited any messengers or foot-posts to carry letters other than the messengers of the king's postmaster-general, with certain specified exceptions. This inland post was placed under the charge of Thomas Witherings, who, with William F rizell, had been entrusted with the English post for foreign letters from the year 1632. In 1640, in post of irregularities, Witherings was superseded in his office, which was then entrusted to Philip Burellacli. Eight main postal lines throughout England were at this period set up. The rates of postage for a single letter were as follows: not exceeding a distance of 40 miles, 1 Penny; 41 to 150 miles, 2 Pennies; beyond 150 miles, 4 Pennies. The great distance in England, 6d.; to Scotland, 8d. In 1649, in the time of the Commonwealth, the court of Common Council for London set up a post in rivalry with that of the parliament; but the Commons promptly put an end to the undertaking. Material changes were made in the post-office, and Cromwell and his parliament in 1657, and an ordinance bearing on the subject furnishes a motive for the establishment of posts—that they will be the best means to discover and prevent many dangerous and wicked designs against the Commonwealth.' At the Restoration the settlement of the post-office made during the Commonwealth was confirmed, and its substance was re-enacted by statute 12 Carols II. cap. 35, which act, being the first strictly legal authority for the establishment of a post-office, has since then been looked upon as its charter. Although in 1633 something was done towards establishing posts between England and Scotland, little was attempted as regards internal communication in Scotland till 1635, when the Scotch parliament passed an act for the government of the private post. 1635 an upholsterer named Robert Murray set up a penny post for the conveyance of letters and small parcels about London, which business was subsequently assigned to Thomas Dockwra. This undertaking was, however, seized by the government and the management of it was in the future, and Dockwra was granted a pension of £200 a year by way of compensation. This system was the commencement of the London Postal District service, and Dockwra was afterwards appointed its controller. About the year 1700 robberies at the posts were so frequent in the neighbourhood of the Borders that acts were passed by the Scotch and English parliaments making robbery of the post-office a grave offence. With the establishment in 1708 a Mr Povey attempted to set up a halfpenny post in London; but this was suppressed as the result of a lawsuit at the instance of the government. By a statute passed in 1710 the post-office was remodelled, a general post-office for the three kingdoms being established and the offices being established under 'Her Majesty's Postmaster-general.' This officer was empowered to keep one chief letter-office in London, one in Edinburgh, one in Dublin, one in New York, and one in the West Indies. The Irish parliament in 1784 passed an act, giving the Irish post-office a separate existence, and creating an independent postmaster-general; but the offices were again united under the British postmaster-general in 1831. In the year 1776 a penny post for Edinburgh and Leith was set up by Peter Williams, and continued on until about 1792, when it was absorbed by the General Post-office. In 1720 Ralph Allen (1694-1764) obtained a lease for life of the crosses-posts at a rent of £5000 a year; and so greatly did he improve the revenue from this source that he realised an annual profit of £12,000, which he lived to enjoy for forty-four years.

The institution of mail-coaches (see Coaching) marks a very important period in the history of the post-office. Their introduction is due to Mr John Palmer, manager of the theatre at Bath, who submitted his plan to Mr Pitt in 1763. In order to carry out his plan Mr Palmer was appointed Controller to the General Post-office, with a salary of £1500 a year and 2½ per cent. on any excess of revenue over £240,000 a year. The running of mail-coaches commenced in 1784, the plan being carried out, like the later great scheme of Sir Rowland Hill, in the face of vehement opposition on the part of officers of the post-office. The new method of conveyance, however, proved most successful, both on account of greater safety to the mails, and acceleration of the correspondence. In 1792 Mr Palmer was superseded from the post-office, and allowed £3000 a year being made to him in lieu thereof; but after a long struggle with the Treasury parliament in 1813 made him a grant of £50,000. The mail-coach era may be said to have covered a period of sixty years, during which time the great road engineers so improved the highways that the speed of the coaches was increased from about six to fully ten miles an hour. Mails were first sent by railway in 1830 over the line between Liverpool and Manchester.

In order of time the next great feature in the history of the post-office is the uniform penny postage scheme of Mr (afterwards Sir) Rowland Hill (q.v.). He suggested his plan of reform in 1837. It evoked strong opposition within the post-office and from a section of the public without; but it was eventually adopted by a majority of 100 in the House of Commons, and the scheme was launched on the 10th January 1840. Immediately prior to that date the inland postage rates were as follows for an ordinary single letter:

<table>
<thead>
<tr>
<th>Distance</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 miles and under 20 miles</td>
<td>4d.</td>
</tr>
<tr>
<td>20 miles</td>
<td>5d.</td>
</tr>
<tr>
<td>30 miles</td>
<td>6d.</td>
</tr>
<tr>
<td>60 miles</td>
<td>7d.</td>
</tr>
<tr>
<td>80 miles</td>
<td>8d.</td>
</tr>
<tr>
<td>100 miles</td>
<td>9d.</td>
</tr>
</tbody>
</table>

For every additional 100 miles 1d. and for every letter carried over the Borders an additional ½d.
The extra halfpenny was charged as an indemnity for toll dues from which, by the Act 53 of Geo. III., 1813, mail conveyances in Scotland having more than two wheels were not exempt. These were the initial rates payable for single letters—i.e., letters not containing an enclosure. If a letter contained an enclosure the letter became a double letter, and double postage was claimed. For a letter weighing an ounce the charge was quadrupled, and each quarter of an ounce in addition added an additional rate to the charge. Under the Act 53 of Geo. III. a letter weighing 1 oz. was levied according to weight, commencing with a penny for a letter not exceeding half an ounce, and a penny for every additional half ounce, irrespective of distance within the kingdom which the letter had to be conveyed. The uniformity of rate as regards distance has been maintained till the present day, though the Rowland Hill scale has been altered. Thus, in 1871 the initial half ounce letter ceased (as regards inland letters), and the scale became as follows: Not exceeding 1 oz. 1d.; not exceeding 2 oz., 1½d.; not exceeding 3 oz., 2½d.; not exceeding 4 oz., 3½d.; not exceeding 5 oz., 4½d.; not exceeding 6 oz., 5½d.; not exceeding 7 oz., 6½d.; not exceeding 8 oz., 7½d.; not exceeding 9 oz., 8½d.; not exceeding 10 oz., 9½d.; not exceeding 11 oz., 10½d.; not exceeding 12 oz., 11½d.; not exceeding 13 oz., 12½d.; and 12½d. being charged for each additional ounce. In 1885 this comparatively heavy charge over 12 oz. was removed. The privilege of Franking Letters (q.v.) enjoyed by members of parliament till 1840, which was a great loss to the revenue, ceased on the 1st January, 1841. Envelopes were introduced, bearing a revenue stamp or mark for postage, and known as the Mulready envelopes, from the name of the artist who prepared the design; but the public would not take to them, and their issue was discontinued. Postage stamps, in early times, were based on the halfpenny, but at this time, and have since continued to be used. The following figures show to what extent cheap postage has stimulated the correspondence of the country. In 1839 the number of letters passing through the post, including franked letters, was 82,500,000; in 1840 the number at once rose to 169,200,000; and in 1890 the number was no less than 1,650,200,000. In addition to this mass of written matter, besides 217,100,000 post-cards, the following articles passed through the post in 1890: Bookpackets and cards, 4,472,500; newspapers, 150,300,000. For some years after the introduction of Rowland Hill's scheme there was a deficit in the post-office revenue, but this was soon covered by the rapid growth of business, and for many years the post-office has paid large yearly profits to the Treasury. In 1890 the gross revenue from all branches of post-office business was £21,211,614; the expenditure, £8,863,527; and the net revenue, £12,348,087. Halfpenny post-cards were introduced in October 1870, and the penny postage upon newspapers was reduced to 1d. In 1898 2,012,300,000 letters were posted; post-cards, 389,400,000; book packets and circulars, 727,300,000; newspapers, 150,900,000; parcels, 67,823,000. The revenue for the year was £12,429,376, and the expenditure £8,682,713, giving a profit of £3,746,664. In the end of 1898 penny postage was introduced throughout the United States, Canada and the Cape, and one or two minor possessions. From 1891 the railway companies were empowered to convey single letters for the public, between their stations, on behalf of the post-office, provided the letters do not exceed 1 oz. in weight. Such letters are charged at the rate of the value of 1d., which goes to the revenue, and a railway stamp of the value of 2½d., which goes to the companies as payment for conveyance. In March 1891 a system of express delivery for letters and parcels was established in London and certain of the more important towns in the kingdom; and shortly thereafter it was made general throughout the country. The delivery is effected by means of the messenger force employed in the telegraph service. When railway, omnibus, or tramcar conveyance only is used by the messenger, the fee, in addition to the ordinary postage, is twopenny for the first mile, and three pence for each additional mile. Higher fees are charged for cab conveyance.

Postal Union.—Under the terms of a treaty concluded at Berne on the 9th October 1874, the object of which was to secure uniformity in the treatment of mail-bags, the members of the Postal Congress, on the 2nd June 1875, agreed to the establishment of a special system of accounts, as well as the reduction of rates within certain limits, and whose provisions were carried into operation generally on the 1st July 1875, the whole of Europe, the United States of America, Egypt, British India, and all the colonies of France were at the outset, or shortly thereafter, included in the Union, and many other countries and colonies have since joined it. The rates of postage to the several states concerned will be found set forth in the British Post-office Guide. The international accounts in respect of postages among these states are settled every year, and by the terms of the treaty each state has the option of paying a levy of £25. The transactions are taken every third year. The rates of postage to Great Britain are not always the same as those from Great Britain, each country having a certain limited discretion in fixing rates.

Registered Letters.—In 1839 the postmaster-general issued an order that postmasters should disseize the public from sending letters by post containing cash in gold or silver, rings, or bracelets, &c.; but this order was rescinded in 1792. At the same time postmasters were again authorised to accept such letters; but before placing them in the mails the postmasters were required to mark the rear of the letters with the front of the letter bill and to tie the letters up with the bill. This mode of giving greater security to letters of value seems to have been the initial stage in the development of the registered letter system. The modern plan of registration is based on the principle that every registered letter must be signed for in passing from hand to hand; and, although the postmaster-general gives guarantee (under special conditions) to but a comparatively small amount, the system affords the public confidence. The great number of letters registered in the United Kingdom in 1890 was 11,357,335. The fee for inland registration, in addition to the ordinary postage, had for many years been fixed at twopenny; but on the 1st June 1891 a combined system of registration and insurance was introduced for letters and parcels, with fees ranging from twopenny to sixpence, and a maximum insurance of £25.

Money Orders.—In the year 1792, by permission of the postmaster-general, some half-dozen clerks who had charge of the 'country roads,' or despatching divisions, in the London General Post-office, set up a system of remittances for the public to and from the post-offices in England and the chief post-offices in Edinburgh and Dublin, the postmasters at these places acting as agents in the scheme. This was the origin of the money-order system, which for many years was managed entirely on their own account. It was not till the year 1838 that it became a recognised branch of the post-office establishment. In the earlier years the rates of commission were very high, thus preventing any extensive development of the business, but for many years the payment of small amounts, on a very moderate scale. In the period from 1850 till the present time the money-order system has been extended to a great many of the colonies and to foreign countries, and every year further extensions are being made. In 1890 the number of money-order offices in the United Kingdom was 9437. The amount of business done in
that year was as follows: Inland orders, 9,027,750, £23,333,417; colonial orders, 453,192, £1,631,616; foreign orders, 893,292, £2,590,872.

Postal Orders.—In pursuance of the recommendations of a committee appointed by the Treasury, of which the late Mr. George Moore, the philanthropist, was chairman, the transmission of money by means of postal orders was begun in London on the 1st January 1881. This simple method of remitting small sums of money has grown rapidly in public favour, and each year adds largely to the amount of business done. In 1890 the total number of orders issued was 44,732,518, representing an aggregate value of £17,737,902.

Post-office Savings-banks.—By Act 24 Vict. chap. 19, a system of savings-banks in connection with the post-office was established in 1861, affording great facilities for thrift to the industrial classes and to young people. The rate of interest payable to depositors is 2½ per cent., calculated upon complete pounds remaining with the post-office complete months. No single depositor may deposit more than £30 in any one year. The number of offices opened for savings-bank business up to the 31st December, 1889, was 4,742; in the 18th December 1889 the number open was 9,353. In this year the deposits numbered 8,101,120, amounting to £19,814,308, and the withdrawals were 2,757,545, amounting to £10,614,268. On the 31st December 1889 a total amount, including interest, remaining in the deposits was £62,999,620. The interest credited to depositors for the year was no less than £1,443,186. The post-office savings-bank is largely used by friendly societies, provident institutions, and penny banks as a safe place of deposit for their funds. Since 1880 depositors have had the right of withdrawing their money from savings-bank stocks with little or no trouble. On the 31st December 1889 the total amount of stock so held was £4,175,634, distributed over 46,993 persons. Under regulations of 1888 the minimum amount of stock purchasable was reduced from £10 to £5. See Savings-banks.

Government Insurances and Annuities.—An Act 27 and 28 Vict. chap. 43, 1864, empowered the postmaster-general to grant life-insurance policies and annuities within certain limited amounts; and the scheme was in operation from the 1st April 1865. These branches of business have not developed beyond very narrow limits, and, in so far as the scheme may have been devised to make life insurance and the buying of annuities on the part of the less well-to-do more general, the attempt has hitherto been a failure.

Post-office Telegraphs.—Prior to 1870 the business of conveying telegraphic messages for the public was in the hands of several rival telegraph companies and the railway companies; but by the Act 31 and 32 Vict. chap. 110, 1865, the postmaster-general was authorised to acquire, work, and maintain electric telegraphs; and by Act 32 and 33 Vict. chap. 73 he acquired (with certain exceptions) the exclusive privilege of sending telegraphic messages within the kingdom. The actual transfer of the working system took place on the 6th February 1870. The tariff was, like the inland postage, a uniform tariff within the United Kingdom, the minimum charge being 1s. for twenty words, with free addresses. In the first complete year of the new management (1870-71) the total number of telegrams transmitted was 850,177. On the 1st October 1885 the minimum charge for a telegram was reduced to 6d. for twelve words, addresses ceasing to be sent free. In the year 1889-90 the number of messages transmitted was 62,403,299. The total sum laid out as capital in connection with the purchase of the telegraphs was £10,880,571; and the annual interest on this sum, 1889 was £299,316, is now borne on the post-office votes. In the year 1888 the number of telegrams was 68,810,786, and the revenue, £2,130,973. The number of offices for postal telegraph business in 1898 was 8175 (see Telegraph). The post-office had also in 1899 53,000 miles of telephone trunk-wires, and connections with the National Telephone Company of the United States.

Parcel Post.—This is the most recent of the greater undertakings entered into by the post-office. By the Post-office (Parcels) Act, 1882 (45 and 46 Vict. chap. 74), the post-office was empowered to convey parcels by post on different conditions from the ordinary post. The object was to give the railway companies for the conveyance of the parcels in bulk being fixed at eleven-twentieths of the gross inland postage received for the parcels, the post-office performing all duties of collection and delivery. This business was entered upon by the post-office on the 1st August 1883, the parcels conveyed being exclusively inland parcels. At the outset the maximum weight of a parcel was fixed at 7 lb. On the 1st May 1886 the maximum weight was raised to 11 lb., and an alteration made that the extra charge for a parcel of 11 lb. being fixed at 1s. 6d. In the 33rd year of the parcel post the number of parcels transmitted was upwards of 22,900,000. On the 1st July 1885 parcel business was extended to certain of the colonies and to foreign countries, and from year to year this connection was further extended. In the year ended 31st March 1890 the total number of parcels of all kinds delivered in the United Kingdom was 42,852,570, the gross postage upon which was £392,113. This vast system of parcel carriage is said not to have damaged the business of the parcel business of the railway companies, and consequently it must be held to be a new convenience created for the public, the value of which it is impossible to estimate.

Inland Revenue Licenses.—Through the medium of the post-office the inland revenue department finds a ready means of issuing a great variety of licenses throughout the country. In the year ended the 31st March 1890 the number of licenses so distributed was 1,518,136, representing a sum of £200,183.

Mail-packet Service.—Occasional reference is made in old writings, and in official records, to the employment of vessels called packets, for the conveyance of the mails, but there seems hardly any continuous account of the services performed by those vessels. In the time of Charles I. regular mail communication between Dublin and Chester, and between Milford Haven and Waterford, conveyed government despatches, and in 1600 one Nicholas Herbert agreed to have his barque in readiness at Whitehaven, with one sufficient master, and other meet and able sailors, to carry letters for His Majesty or the council at Dublin for £10 per lunar month. It would seem that for some time anterior to 1788 the packets belonged either to the crown, to members of the post-office staff, or to their friends, for in that year a commission upon fees of public offices recommended this system should be done, and that contracts should be obtained by public advertisement. The recommendation was, however, only partially acted upon at that time, and no public contracts were entered into, apparently, until after 1857, at which period the packet service was placed under the control of the Admiralty. Another committee in 1848 strongly urged an extension of the contract system, and a similar recommendation was made by Lord Canning's Committee of Inquiry into packet-contracts in 1853. This committee also recommended that the stipulation as to the arming of the packets
should be omitted in future contracts, and the committee's views in this matter were then given effect to. The mail-packet contract business remained in the hands of the Admiralty till the 1st April 1800, when the whole management was taken over. In order to effect rapidity and regularity of service, it has been necessary from time to time to grant vast subsidies to the mail-packet contractors, in those cases where the exigencies of trade had not secured those conditions; but the growth of finances and gradual emancipation has enabled the post-office in many cases to obtain easier terms. At the close of the 17th century a mail-packet was a vessel of some 85 tons, and in the last years of the 18th century a mail-packet on the Falmouth station, reckoned fit to proceed to any part of the world, was one of about 179 tons. The packets at this time sailing to and from the Continent were of about 70 tons or thereabouts. About 1840 packets performing the American service were vessels of about 400 or 500 tons burthen. Steam-vessels were first employed in the British mail service in 1849, and since then vast strides have been made both in the speed and carrying capacity of these ships. The British mail-packets are to be seen in almost every sea on the globe. For the Atlantic service steemers of from 7000 to 10,000 tons are employed, making the transit of this ocean in 6 days. So late as 1829 the time allowed for a packet trip to and from America was 105 days. The contract services at home are very numerous, and those to foreign stations are almost co-extensive with the high seas. In the year 1889-90 the total payment made by the post-office for packet services was £665,375, full details of which will be found in the post-master-general's annual report.

Rates and Regulations.—In the scope of an article like this it is impossible to review the past rates of postage and changes of regulations that have taken place from time to time. The conditions applicable to the business in relation to the public will be found fully set forth in the Post-office Guide, which may be consulted at any post-office, and to which the reader is referred.

Staff.—The highest authority in the post-office is the postmaster-general. This officer is a member of the government, a privy-councillor, and sometimes a cabinet minister. All important measures of administration, appointments of officers, and dismissals are passed under the authority of the postmaster-general in the form of minutes. This department also includes the secretaries, a financial secretary, four other secretaries in London, a surveyor-general in Scotland, and a secretary in Ireland. The several secretaries under the first secretary take charge of separate branches of post-office business. Another important officer is the receiver and accountant-general. This officer is responsible for the whole vast accounting work of the post-office, the collection of its revenue, and the distribution of its expenditure. He has no power, however, except by effecting economies of work or reform of method, to reduce the latter or to increase the former. The laws of revenue and expenditure are fixed by higher authority. The total number of persons employed by the post-office (1890) is 113,560. Of these 61,054 are established officers, and 52,496 unestablished and persons not given to the public. The total number of employees comprises 89,373 males and 24,177 females. The salary of the postmaster-general is £2500 per annum, and of the chief-secretary a maximum of £2000. On a change of government the postmaster-general demits his office.

Espionage of Letters.—The post-office statute of Queen Anne contains a prohibition, repeated in subsequent acts, against letters being opened or detained by persons in the service of the post-office, except under a warrant from one of the principal secretaries of state. During the 18th century such warrants were often granted upon very trivial pretexts. At Bishop Auckland Addressing, 1272 copies of his letters, intercepted in the post, were produced as evidence against him; and it would seem that about 1735 a system was kept up at immense expense for the examination of home and foreign correspondence. In 1782 the correspondence of Lord Temple, then the lord-lieutenant of Ireland, was subjected to such treatment in the post. The 19th century brought a change for the better in this respect, and in 1806 Lord Spencer initiated the custom of recording the dates of all warrants granted, and the grounds upon which they were issued. Since 1892 the warrants have been preserved at the Home Office; and a House of Commons return in 1833 shows that, in the preceding ten years, only six letters were detained and opened,—four in cases of felony. When Sir Robert Peel introduced the Penny Post, in 1840, a warrant was issued for the arrest and opening of the letters of Mazzini, the matter contained in them being conveyed to the Austrian minister. This act involved the government of the day in serious public obloquy, and produced a widespread, though groundless, disturbance. The postmaster-in-chief may make regulations for the destruction of intercepted letters, subject to the ordinary correspondence of the country. It may safely be held that this power of opening letters in the post has been very rarely exercised in recent years.

Dead-letter, or Returned-letter Office.—A department of the post-office appointed to deal with letters, books, newspapers, &c. which cannot be delivered to the persons to whom they are directed. When a letter or other postal packet is refused at the address which it bears it is kept by the post-master, if an inland letter, &c., one day, and if a colonial or foreign letter, &c., three days, before being sent to the returned-letter office. Inland letters are here opened, and those which contain the writers' addresses are at once returned to them; while those which furnish no indication of the addresses of the senders, and contain nothing of value, are immediately destroyed. The number of the senders' addresses on the outside, in the form of medalion or otherwise, are, however, usually returned without being opened. Foreign and colonial letters, after being retained from one week to one month, are returned unopened to the country of origin. The secretary is directed to suppress all letters found to contain value. In the year 1889-90 the following numbers of articles were received in the various offices constituting this department: letters, 63,311,102; post-cards, 841,076; book-packets (including circular-letters passing at book-post rates), 6,661,201; newspapers, 531,022; patterns, 27,488; parcels, 167,583. Of the letters 119,386 were re-issued to corrected addresses, and 5,359,551 returned to the senders, while 214,859 were returned unopened to foreign countries. Of the total parcels received 81,277 were either re-issued to corrected addresses or returned to the senders. The returned-letter department has not only principal offices in London, Edinburgh, and Dublin, but branch offices in the other more important towns.

Offices of the Post-office.—In view of the vastly important services rendered to the public by the post-office, involving the imposition of great responsibility upon its officers, and of the necessity which obviously exists for the protection of the revenue (the conveyance of letters being a matter of monopoly), it is thought fit to pass special enactments for the regulation of the one and the safeguarding of the
other. In addition, enactments have been passed from time to time bearing upon the other branches of post-office business. The following are some of the offences recognised in the enactments:

Every person employed by or under the post-office who steals, secretes, or destroys a post-letter is guilty of felony, and if it contain a chattel or money the punishment is death 

Every person who posts letters or other postal packets out of the customary office or its officers are likewise guilty of felony, and similarly punishable; and a person who fraudulently retains or willfully keeps or detains a letter or other postal packet delivered to him by mistake, or for any other reason from which he may have found, is punishable by fine and imprisonment. The moment a letter or other postal packet is put into the post-office, or is delivered to a person authorised to receive such missives for the post, the protection of the statute commences, and it ceases on the letter being delivered at the place of its address. If a postman delay the delivery willfully, or if an officer of the post-office disclose or intercept or willfully delay a telegraphic message, he commits a misdemeanor of the post-office or the contents stolen or taken from the post-office are guilty of felony. By the 1 Vict. chap. 36 sect. 2, any person sending or conveying otherwise than by post letters or packets not exempted from the exclusive privilege of the postmaster-general, or persons not entitled or authorised to send letters or parcels, or persons who, being otherwise entitled, are liable by reason of their own breeding or manner of life, are, or are by the same or any other means, by any means liable at the discretion of the postmaster-general, or if such persons send letters or packets which are not conveying letters or packets from place to place, is liable to a penalty of £5 for every such letter or packet. This exclusive privilege or monopoly does not extend to newspapers. There are, however, exceptions to the general rule as regard post-office packets. Thus, articles of conveyance are, in course of conveyance by a private friend and not by the post-office. Letters sent by messengers on purpose, on the private affairs of the sender or receiver, commissions and legal letters, letters of merchants sent by their own vessels or along with goods to which they relate, and likewise excepted. But no person is permitted even to collect these excepted letters for the purpose of sending them in the manner described, for this is infringing the exclusive privilege of the post-office. Moreover, certain persons are by the statute, carrying letters even gratuitously—viz. common carriers unless the letters relate to goods in their carts or wagons; owners, masters or commanders of ships, except letters of the owners of the ships or such as relate to goods on board; and passengers or other persons on board any ship, or on any lines or roads on a postal order as well, in the case of a cheque, or knowingly offers, utterers, or disposes of any order, with such fraudulent oblation, addition, or alteration, is guilty of a felony, and is liable to the like punishment as if the order were a cheque. By the Act 45 and 46 Vict. chap. 74, relating to the parcel post, that act is to be deemed to be a post-office act within the meaning of the Post-office Acts (Money Orders) Act, 1837. This, however, subject to its provisions. The Post-office Acts apply to parcels in like manner as they apply to other postal packets. Act 47 and 48 Vict. chap. 76 —the Post-office (Protection) Act, 1834—deals with a variety of offences under the following heads: prohibition of affixing baneful designs against post-office letter-boxes; prohibition of sending by post explosive, dangerous, or deleterious substances, or indecent prints, words, &c.; prohibition of affixing placards, notices, &c. on a post-office, letter-box, or other post-office property; prohibition of imitation of post-office stamps, envelopes, cards, forms, and marks; prohibition of fictitious stamps; prohibition of false notice implying that any place is a post-office, postal telegraph office, or post-office letter-box: obstruction of officers of the post-office in the discharge of their duties; obtaining of clothing by officers of the post-office on ceasing to be officers; forgery and improper disclosure of telegrams. Contraventions of these prohibitions entail penalties generally ranging from twelve months' imprisonment with hard labour, or a fine of £2, or both; and the service charges on letters greater than £1 are 5s., and on newspapers..

Foreign Post-office Systems.—The advantages of the post are now enjoyed, in a greater or less degree, by all civilised countries; and the several systems bear in their main features a general resemblance to the British system, upon which, in many cases, they have been modelled. At the same time details of marked difference may be observed, each country having adapted its system to its own particular wants. Thus, in certain countries subscriptions to the newspapers and accounts for merchandise are collected by the post-office; the parcels post conveys larger and heavier articles than are conveyed in Great Britain; a system of sending through the post letters of declared value is in force in some; and a different means is employed for transferring mails to and from mail trains while running. Besides a classification of the goods sent in regard to rates of postage is not uniform. The amount of matter conveyed through the post between Great Britain and certain foreign countries is enormous—e.g. the average number of sacks of mails despatched weekly in 1839 from the United States was 1200, and to the Australian colonies 410.

United States.—The beginnings of a postal service in the United States date from 1639, when a house in Boston was employed for the receipt and delivery of letters for or from beyond the seas. In 1672 the government of New York colony established 'a post to goe monthly from New York to Boston;' in 1702 it was changed to a fortnightly one. A general post-office was established and erected in Virginia in 1692, and in Philadelphia in 1693. A deputy postmaster-general for America was appointed by an act of the Pennsylvania legislature in 1710 (see p. 347) he was directed to keep his principal office in New York, 'and other chief offices in some convenient place or places in other of Her Majesty's provinces or colonies in America.' The monopoly was established which included also the transport of travellers, and a tariff was fixed. The system, however, proved a failure, until 1753, when Benjamin Franklin became postmaster-general; when he was removed from office in 1774 the net revenue exceeded £3000.

In 1789, when the post-office was transferred to the new federal government, the number of offices
in the thirteen states was only about seventy-five. A conception of the remarkable progress in the ensuing century is supplied in the table below. Outstanding events in the history of the American postal service have been the negotiation of a postal treaty with England (1846), the introduction of postage-stamps (1847), of stamped envelopes (1852), of the system of registering letters (1855); the establishment of the free-delivery system, and of the travelling post-office system (1863); the introduction of the money-order system (1864), of post-office carts (1873), and, between the last two dates, of stamped newspaper-wrappers, and of envelopes bearing requests for the return of the enclosed letter to the writer in case of non-delivery; the formation of the Universal Postal Union (1873); the issue of "postal notes" payable to bearer (1883); and the establishment of a special delivery system (1885), under which letters bearing an extra ten-cent stamp are delivered by special messengers immediately on arrival at the post-office of destination. Later progress is found in the rapidly-growing system of free rural delivery, and in the extensification of domestic rates to the island possessions. The postmaster-general is a member of the cabinet. Under him about 100,000 persons are employed, of whom some 60,000 are postmasters. Most of these, except letter-carriers and clerks, are selected from the list of the post-office with a view to filling the office of a new political party. The following table shows the increase, during the first century of the department's history, in offices, length of mail routes in miles, revenue, &c., with figures for 1898.

<table>
<thead>
<tr>
<th>Years of Post-Office Service</th>
<th>Officers</th>
<th>Miles</th>
<th>Revenue</th>
<th>Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1790</td>
<td>73</td>
<td>1780</td>
<td>$28,000</td>
<td>$28,400</td>
</tr>
<tr>
<td>1800</td>
<td>905</td>
<td>1870</td>
<td>29,000</td>
<td>213,054</td>
</tr>
<tr>
<td>1810</td>
<td>3,000</td>
<td>1880</td>
<td>32,308</td>
<td>406,069</td>
</tr>
<tr>
<td>1820</td>
<td>3,000</td>
<td>1890</td>
<td>31,240</td>
<td>495,150</td>
</tr>
<tr>
<td>1830</td>
<td>3,400</td>
<td>1895</td>
<td>32,400</td>
<td>550,190</td>
</tr>
<tr>
<td>1840</td>
<td>4,200</td>
<td>1896</td>
<td>32,450</td>
<td>616,410</td>
</tr>
<tr>
<td>1850</td>
<td>4,200</td>
<td>1897</td>
<td>32,610</td>
<td>622,300</td>
</tr>
<tr>
<td>1860</td>
<td>4,200</td>
<td>1898</td>
<td>32,810</td>
<td>632,200</td>
</tr>
</tbody>
</table>

As will be seen, the United States post-office department, unlike that in Great Britain, is carried on at a loss; this is due to the large amount of postal matter of certain classes carried at less than the cost of distribution, and to some kinds of correspondence carried free. In 1898 there were 12,325,703,000 pieces of mail and packages, 15,416,892 registered and parcel post, 1,061,416 through registered pouches, &c. In 1890 there were conveyed by post:

- Letters, post-cards, &c. | 2,289,550,015 |
- Newspapers, &c. | 776,425,415 |
- Other mail | 310,247,199 |
- Articles sent free of postage | 370,569,165 |
- Articles of all kinds for foreign countries | 41,273,812 |

Grand total: 4,005,400,206

The number of post-offices in the United States is larger than in any other country; but as regards the number of persons employed the United States takes third rank. It provides a post-office for every 1003 persons, while in Great Britain the proportion is one to every 2165 persons.

See the articles STAMPS, TELEGRAPH. The following works may also be consulted: Postmaster-general's Annual Reports, issued yearly since 1835; Her Majesty's Message by Sir H. B. S. Hume, "The History of Penny Postage," by Sir R. H. and G. H. B. St. George (1890); Fifty Years of Public Work, by Sir Henry Cole (1884); The History of the Post-office to 1856, by H. Joyce (1901); The Post-office, by F. C. Baines (1886); The Royal Mail (1835), and The Post in Great Britain (1881), by the present writer.

Post-Tertiary. See QUATERNARY.

Posy. See Ring.

Potash. See Potassium.

POTASSIUM

Potash Water. See AERATED WATERS.

Potassium (sym. K. equiv. 39) is one of the alkaline metals. The letter K is selected as its symbol, being the first letter of Kali, the Arabic word for potash, the letter P has been in vain attempted to be derived from the Greek polemos, war. The following are the chief characters of this metal. It is of a bluish-white colour, and presents a strong metallic lustre. It melts at 146° 5' (62° 5' C), and at a red heat is converted into vapour. Its affinity for oxygen is so great that on exposure to moist air it immediately becomes covered with a film of oxide, and hence it must be kept below the surface of maphtha. When heated it burns with a violet flame. Its intense affinity for oxygen is well shown by throwing it into water, on which, from its low specific gravity, 1.05, it floats. The metal abstracts oxygen from the water, and forms oxide of potassium (potash); while the liberated hydrogen carries off a small portion of the volatilised potassium, and, taking fire from the heat evolved by the energetic chemical action, burns with a brilliant flame. Its chemical affinities are extraordinarily varied. Of all the metals, none more resemble it than the alkali metals; the burning metal swimming about rapidly on the water, and finally disappearing with an explosion of steam, when the globule of melted potash becomes sufficiently cool to come in contact with the water.

Potassium does not occur in the native state, and can only be obtained by the reduction of its oxide, potash. In 1807 Davy prepared it by decomposing its hydrated oxide (potash) by means of a volatile current, but this process is not applicable on the large scale. It is now usually manufactured by dissolving a mixture of carbonate of potash and charcoal in an iron retort.

If proper proportions are taken, the mixture is wholly converted into carbonic oxide and potassium, as is shown in the equation:

K₂CO₃ + 2C = K₂ + 3CO

Potassium forms two compounds with oxygen, viz. a protoxide, KO, which constitutes potash, and is strongly basic, and a peroxide, K₂O₄, of these the former is the one of most importance. Potash is procured in the anhydrous form by heating thin slices of the metal in air perfectly free from moisture or carbonic acid. It is white, very deliquescent, and caustic. When moistened with water it becomes incandescent, and the water cannot be expelled by any means. The most important substance is the Hydrate of Potash or Caustic Potash (KOH = K₂O₂H₂O). This is commonly prepared by dissolving carbonate of potash in ten times its weight of water, and gradually adding to the boiling solution a quantity of skewled lime, equal in weight to half the carbonate of potash used. The resulting compounds are carbonate of lime, which falls as a precipitate, and hydrate of potash, which remains in solution; the changes being expressed by the equation:

K₂CO₃ + Ca(OH)₂ = CaCO₃ + 2KOH.

The clear supernatant fluid is removed by decantation, or by means of a sjolin, into a clean silver or iron vessel, heated until it flows tranquilly like oil; it is then either cast into cylinders in metallic moulds, or is poured upon a cold slab, and solidifies on cooling. As so obtained it is very impure, but by solution in alcohol and evaporation a very pure article may be produced.

Hydrate of potash, on solidifying after fusion, occurs as a hard, grayish-white, opaque body, with a crystalline fracture, which may be readily again fused into a colourless oily fluid, but which only
volatilises at a very high temperature. It is soluble in about half its weight either of water or of alcohol, and rapidly absorbs both carbonic acid and oxygen. It leaves a thin less soluble than a powerful emetic, and quickly destroys both animal and vegetable tissues, and hence its solutions can only be filtered through asbestos or pounded glass or sand. Its affinities are so powerful that few vessels can stand its reaction upon test-paper. Its solution must be preserved in glass bottles into the composition of which no oxide of lead enters, as it has the property of dissolving this oxide out of the glass. Vessels containing silica (porcelain, earthenware, &c.) are decomposed, and platinum itself is oxidised when heated in contact with it.

The salts which potash forms with acids are for the most part readily soluble in water, and colourless, unless (as, for example, in permanganate of potash) the acid is coloured. Most of them are crystallisable, and they all communicate a light tint, characteristic of potash, to the flame of spirit of wine and to that of the blowpipe. Many of them occur in animals and vegetables, and the ashes of plants contain them in large quantity.

Carbonate of Potash, $\text{K}_2\text{CO}_3$, is obtained by burning in a blowpipe the ashes of plants and bones washed in water, evaporating till the sulphates, chlorides, &c. separate in crystals, and then boiling the mother liquid to dryness in iron pots. The quantity of pure carbonate of potash contained in it is liable to great variation, and for pharmaceutical purposes it must be dissolved in water and crystallised in a vessel in which the crystals containing about 20 per cent. of water. Carbonate of potash is extremely deliquescent, and is soluble in less than its own weight of water, but is insoluble in alcohol. It has an acrid, alkaline taste, and is closely similar to the alkaline earths, and it is a compound of great importance, both as a chemical reagent and as entering largely into the preparation of most of the other compounds of potash, and into the manufacture of soap and glass.

The commercial carbonate is often called Pearl Ashes. Bicarbonate of Potash, $\text{KHCO}_3$, is obtained in white rhombic prisms, by passing a current of carbonic acid gas through a strong solution of carbonate of potash. These crystals are permanent in the air, but are decomposed by heat; water and carbonic acid being evolved, and the simple carbonate of potash being left. The crystals of the carbonate, requiring four parts of cold water for its solution, which is nearly neutral to test-paper, and has a much milder taste than the preceding salt. It is employed as an antacid in medicine. The Sulphate, $\text{K}_2\text{SO}_4$, and Thiosulphate, $\text{KHSO}_3$, may be prepared by treating potash with sulphuric acid. Nitrate of Potash has been already described under the head Nitre. Chlorate of Potash, $\text{KClO}_3$, occurs in white rhomboideal tablets of a nearly lustre. It has a cooling taste like that of nitre. It fuses at a gentle heat without decomposition, but on increasing the heat it gradually gives off all its oxygen, and is converted into chloride of potash, according to the equation:

$$2\text{KClO}_3 = 2\text{KCl} + 3\text{O}_2$$

It is not very soluble, as it requires for solution 16 parts of cold and 1-7 parts of boiling water. It even surpasses nitrate of potash as an oxidising agent; and if combustible substances, such as carburets of carbon in the presence of air, be heated in a test-tube, or be forcibly rubbed with it, a detonation or explosion occurs. This salt is employed in the manufacture of Matches (q.v.), in certain operations in calico-printing, and for filling the friction-tubes employed for firing cannon: the best mixture for these tubes consists of 2 parts of this salt, 2 of sulphide of antimony, and 1 of powdered glass. A mixture known as White Gunpowder, consisting of chloride of potash, dried ferrocyanide of potassium, and sugar, has been employed for illuminating matches, but its preparation is accompanied by so much danger that it is seldom used. This salt does not occur as a natural product, but may be obtained along with chloride of potassium by passing a current of chlorine gas through a hot solution of caustic potash. The two salts can easily be separated by crystallisation, as the chloride is comparatively insoluble, and the chloride extremely soluble. Hypochlorite of Potash can only be obtained in solution. Under the title of Eau de Javelle, it is sold as a bleaching agent. It is obtained by passing chlorine gas through a cold dilute solution of carbonate of potash, when chloride of potassium and hypochlorite of potash are formed, from which the chloride may be removed by crystallisation. The Phosphates of Potash, formed by the different varieties of phosphoric acid, are sufficiently noticed in the articles PHOSPHORUS and MANURE.

The Silicates of Potash are important compounds in connection with the manufacture of glass; they also enter into the composition of Fuchs's Soluble Glass (see GLASS), or Water-glass, and have been employed for bleaching purposes. The sulphides of magnesium and other limestones may be prevented. The Chromate and Bichromate of Potash are noticed in the articles CHROMIUM and CARBONIC ACID.

The limpid salts of potash may be passed on very briefly. The Chloride of Potassium, $\text{KCl}$, is prepared by boiling a large quantity in the preparation of chloride of potash, or may be procured by burning potassium in chlorine gas, when the result of the brilliant combustion which takes place is this salt. In its general character it is closely similar to common salt, $\text{NaCl}$, except that the former communicates a violent sensation to the latter a yellow tint to the flame of alcohol. It is a constituent of sea-water, of salt marshes, and of many animal and vegetable fluids and tissues. The Bromide and Iodide of Potassium are noticed in the articles BROMINE and IODINE.

Fluoride of Potassium, $\text{KF}$, possesses the property of cornding glass. There are several sulphides, the most important being the Liver of Sulphur, prepared by fusing together carbonate of potash and sulphur. Besides its use in skin diseases, it is much employed for bleaching purposes, and gives a violet colour to the latter a yellow tint to the flame of alcohol. It is a constituent of sea-water, of salt marshes, and of many animal and vegetable fluids and tissues. The Bromide and Iodide of Potassium are noticed in the articles BROMINE and IODINE. The Cyanide of Potassium, $\text{KC}($, may be obtained commercially by fusing together 3 parts of ferrocyanide and 3 of carbonate of potassium. This salt forms colourless deliquescent crystals very soluble in water. It exhauses an odour of hydrocyanic acid, and is nearly as poisonous as that acid. Its great deoxidising power at a high temperature renders it a valuable agent in many of the finer operations of metallurgy, and in a dilute solution, it is a solvent for natural gold, and is used (the 'cyanide process') for the profitable treatment of low-grade free-milling ores, in which the gold occurs in fine particles, not otherwise utilisable.

The following are the ordinary tests for the potassium compounds: (1) Some of the solution is added in excess to a moderately strong solution of a potassium salt gives after some time a white crystalline precipitate of cream of tartar (see TARTARIC ACID). The result is hastened by stirring or shaking. (2) The same salt gives a crystalline yellow precipitate, which is a double salt of bichloride of platinum and chloride of potassium. If not previously acid, the mixture to be tested should be acidulated with hydrochloric acid. (3) The violet tint occurring in the presence of potassium in the outer flame of the blowpipe,
or in the flame of spirit, has been already noticed. (4) The spectrum of a flame containing potassium exhibits a characteristic bright line at the extreme limit of the red, and another at the opposite violet limit of the Spectrum (q.v.).

In medicine the following compounds are used: Carbonate of Potash, or Hydrate of Potash, KOH, which occurs in it, and is employed in its pure form in dissolving the animal tissues, it is sometimes used as a caustic, although its great deliquescence renders it somewhat difficult to localise its action to the desired spot. In bites of venomous serpents, mad dogs, etc., it may be applied with advantage, and it is useful in destroying warts and fungoid growths of various kinds. Solution of Potash, commonly known as Liquor potassse, is obtained by the process already given for the preparation of hydrate of potash. Liquor potassse, in combination with a tonic infusion, is of service in cases of dyspepsia which are accompanied with excessive acidity of the stomach, such, for example, as often occur in habitual spirit-drinkers. It is also frequently given with the view of rendering the urine alkaline, or of diminishing its acidity in cases in which that secretion has need of it. The use of potassse gradually increased to as much as a fluid drachm. Acetate of Potash, KC,H,0, is obtained by the action of acetic acid on carbonate of potash, and occurs in white foliaceous salty masses. In its passage through the system it is converted into carbonate, and thus renders the urine alkaline. In small doses, as from a scruple to a drachm, it acts as a diuretic, and is of service in some forms of dropsy. Combined with other potass-salts, it is much given in acute rheumatism. The two carbonates and the sulphurated potash have been already referred to.

The Chlorate of Potash has come much into use as a popular remedy for sore throats. For this purpose it is usually employed in the form of compressed pellets, which are allowed to dissolve slowly in the mouth.

Potato (Solanum tuberosum; see SOLANUM) one of the most important of cultivated plants, and in universal cultivation in the temperate parts of the globe. It is a perenniaI, having herbaceous stems, 1 to 3 feet high, without thorns or prickles; pinnae leaves with two or more pair of leaflets and pinnae. The flowers about an inch or an inch and a half in breadth, the wheel-shaped corolla being white or purple, and more or less veined, followed by globular, purplish fruit, of the size of large gooseberries; the roots producing tubers. The herbage has a slightly narcotic smell, although cattle do not refuse to eat a little of it, and the tender tops are used in some countries like spinach. The tubers are, however, the only valuable part of the plant. It was long customary to speak of the potato as a native of mountainous districts of tropical and subtropical America, but it has not been determined whether it is really indigenous, and where it has spread after being introduced by man. Humboldt doubted if it had ever been found truly wild; but subsequent travellers, of high scientific reputation, express themselves thoroughly satisfied on this point. It has been rendered certain that long before the Spaniards reached the New World the potato was cultivated by the Incas and other Andean nations. It seems to have been first brought to Europe by the Spaniards, from the neighbourhood of Cuzco, in the beginning of the 16th century, and to have spread from Spain into the Netherlands, Burgundy, and Italy, but only to be cultivated in a few gardens as a curiosity, and not for general use as an article of food. It is said to have been brought to England from Virginia by Sir John Hawkins in 1563; and, again, in 1568 by Sir Francis Drake, to whom indeed a statute, as the introducer of the potato, was erected at Offen- burg, in Baden, in 1538. Anyhow, it cannot have attracted much notice; and though Raleigh is believed to have planted potatoes both at his Devonshire birthplace Hayes, and on his Munster estates, it was a long time before they began to be extensively cultivated in England. It had become almost all Europe countries the same name with the Batatas or Sweet Potato (q.v.), which is the plant or tuber meant by English writers down to the middle of the 17th century in their use of the word potato. It was not until 1597, published in 1597, gives a figure of our potato under the name of Batata Virginiana; but so little was its merits appreciated that it is not even mentioned in the Complete Gardener of Loudon and Wise, published more than a century later, in 1719; whilst another writer of the same time says it is inferior to skirret and radish! It began, however, to be imagined that it might be used with advantage for feeding 'swine or other cattle,' and by-and-by that it might be useful for poor people, and for the prevention of famine. In 1659 the Duke of York's Commission for the Prevention of Famine in Ireland took up this idea, and in 1663 adopted measures for extending the cultivation of the potato, in order to the prevention of famines. To this the example of Ireland in some measure led, the potato having already come into cultivation there to an extent far greater than in any other European country, and with evident advantage to the people. From Ireland the cultivation of the potato was introduced into Lancashire about the end of the 17th century, soon began general there, and thence spread over England; so that before the middle of the 18th century it had become important as a field-crop, which it became in the south of Scotland some twenty or thirty years later, about the same time in Saxony and some other parts of Germany, but not until the later part of the century in some other parts of Germany and in France. In France the potato was long supposed to cause leprosy and fevers, and the extension of its culture was mainly due to the exertions of Parmentier (1778). In Prussia Frederick the Great took an interest in it, and promoted it by compulsory regulations. The potato has the most important as affording food both for human beings and for cattle; and next to the principal cereals is the most valuable of all plants for human food. It is also used for various purposes in the arts. No food-plant is more widely diffused; it is cultivated in subtropical countries, and struggles for existence in gardens, even within the Arctic Circle, yielding small and watery tubers, although the effects of late spring frosts, or early autumnal frosts, upon its foliage often prove that it is a plant properly belonging to a climate milder than that of most parts of Britain. A more familiar and poetic use than that of the potato has been its employment in the musical comedy of 'The Wish,' which was produced in 1846 and 1847 in Ireland and elsewhere from the failure of the crop. The results—due mainly to excessive and imprudent cultivation of the potato—confirmed two great laws, that the plants which live longest in soils cultivated in the same district, however successfully they may be cultivated for a time, are sure to fail at last; and that the exclusive, or almost exclusive, dependence of a people on one source or means of support is unfavourable to their welfare in respect to all their interests.
Humboldt calculates that the same extent of ground which would produce thirty pounds of wheat would produce one thousand pounds of potatoes. But though it degenerates, as it is accustomed to the wheel, and the constant employment of them as the chief article of food is not favourable to the development of the physical powers, and is consequently in its protracted influence unfavourable to mental energy, it is widely cultivated in Ireland, and the Highlands of Scotland, in a race capable of the highest development. It is calculated that 100 parts of good wheat-flour, or 107 parts of the grain, contain as much actual nutriment as 613 parts of potatoes. The inferiority of the potato in many respects, like the drills used in the corn, is compensated by a comparatively small quantity of nitrogenous substances which it contains, in consequence of which it is most advantageously used along with some very nitrogenous article of food, in Britain generally with animal food, in some parts of Europe with curds or with cheese. The potato tuber, in a fresh state, contains about 71 to 80 per cent. of water; 15 to 20 per cent. of starch, 3 to 7 of fibre or woody matter, 3 to 4 of gum, dextrine, and sugar, and 2 of albumen, gluten, and casein. There are considerable differences, however, in the proportion of these substances in different varieties, and in different soils and seasons.

Potatoes are used, both raw and boiled, for the feeding of cattle. For human food they are variously prepared by roasting or boiling, but now chiefly by boiling, a process by which they are freed from their starch, or a gummy and disagreeable matter, which the water in which potatoes have been boiled is wholly a wholesome.

The herbage or haulm of the potato has been used for making paper, but the results were not encouraging. Potato pulp produces a kind of cellulose paper, very like, or even superior to that from the morulae of the hydras. The berries yield by distillation a tolerable spirit.

The varieties of the potato in cultivation are extremely numerous—500 were exhibited at the Westminster Tercentenary Exhibition (1886). Any enumeration or classification of them is impossible. New ones are continually appearing, and old ones passing away. Those most advantageously cultivated in particular soils and climates are often found to thrive in these forms of ground which are small distances. Potatoes differ considerably in the character of their herbage—which is sometimes erect, sometimes straggling—and in the size and colour of their flowers, but are more generally distinguished by the size, form, and colour of their tubers, which are round, long, or kidney-shaped, white, red, dark purple, variegated, &c.

New varieties of potato are produced from seed; but potatoes are ordinarily propagated by planting the tubers, or cuttings of the tubers, each containing an eye or bud. Much has been written by gardeners and agriculturists on the comparative advantages of planting whole tubers or cuttings, but the latter method generally prevails.

Potatoes are planted in drills, made either by the spade or plough, or in couch beds, which are always made when the land is cultivated as arable land. The bases of potatoes are covered over with earth dug out of the alleys. The alleys serve, although imperfectly, for drains in undrained land. The cultivation of potatoes as a field-crop seems to have been first attempted in the Netherlands. They are still common in many parts of Ireland, but are now scarcely ever seen in England or Scotland. They are very suitable for strong, heavy, and somewhat moist land, and are profitably used in reducing some kinds of soil to cultivation, but are generally unsuitable for field-culture, owing to the expense of labour required. In strong, heavy land potatoes are cultivated in raised drills; in lighter and drier soils the raising of the drills is unnecessary. Manure is invariably given, with various and general artificial manures. Common dressings consist of from fifteen to twenty-five tons of dung per acre, with from five to ten cwt. of artificial manure, such as guano, dissolved bones, superphosphate, a little potash, and perhaps nitrate of soda or sal ammoniac. With Irish farmers the cultivation of potatoes, after they are planted, whether in the field or garden, consists chiefly in keeping the ground clear of weeds, and in earthing up the plants, to promote the formation of tubers. Potatoes are taken up by the fork, by turning over the drills, and by an implement specially designed for the purpose, known as a potato-raiser. Where the crop is grown extensively this implement is now almost universally used, and performs its work expeditiously and thoroughly.

Potato seed is forced in small boxes in which it is placed over winter, and from which it is taken in spring when it is twenty-five to thirty days in the ground, and planted in well-manured drills. Potato seed thus prepared may be dug about three weeks earlier than if the seed had not been sown.

The main field-crop is allowed to ripen thoroughly, and is capable of being stored for winter and spring consumption. This potato, however, is not be successfully practised in most parts of Britain before February or March, and in many seasons the later-planted are found as early as the earlier-planted, and more productive. The storing of potatoes is variously accomplished in dry lofts or sheds, in airy cellars or lofts, and in pits, which are sometimes holes excavated to a small depth in the earth, with the potatoes piled up above the surface of the ground, in a conical, or in a roof-like form, sometimes mere heaps of one or other of these forms. The potatoes are covered with straw and earth to keep out light and frost. Potato-pits should always be well ventilated by means of pipes or otherwise, as without ventilation the potatoes are apt to heat and sprout. Potatoes taken from the ground before they are quite ripe are extremely apt to heat and sprout. The potato crop is now an important one in almost all the rotations practised in Britain, although its cultivation is in most districts not quite so extensive as before its failure from the potato disease in 1845 and subsequent years, and farmers are more careful not to depend too much upon it. It very commonly succeeds a grain-crop, but sometimes is advantageously planted on land newly broken up from grass.

But, besides its value as a culinary vegetable, the potato is important in other respects. Its starch is very easily separated, and is in large proportions; hence it is cheaper than any other kind. It is manufactured on a very large scale. It is chiefly used in textile manufactories under the name of farina, which is converted into dextrine or British gum (see STARCH). In Holland and in Russia, where there is much difficulty in keeping potatoes through the winter, and there is consequently a necessity for using the crop quickly, large quantities of starch are made, and this is converted into sugar or syrup (see SUGAR). The refuse of the starch-manufactories is all utilised; it is pressed out from the water,
and used either for pig feeding or for manure. In the north of Europe much spirit for drinking is made from potatoes; it is called Potato-Brandy.

The potato is subject to several diseases, the chief of which is that serious fungous affection now commonly known as the potato disease. This disease was first observed in Germany; the earliest known outbreak of a grave character occurred at Liege in 1842. It broke out in Canada in 1844, and once proved very destructive. In the following year it made its appearance in the British Isles, having been first observed in the Isle of Wight. Its ravages in Ireland in 1846 and 1847 brought a terrible famine upon the small farmers of that country, and at frequent intervals since it has caused great losses in the potato crop.

It has been proved beyond doubt that a particular fungus always accompanies this peculiar and destructive disease. The point is still doubted by some, but it is now very generally believed that this fungus is the main cause of the disease. This mysterious fungus, Phytothornia infestans, runs through a strange life-cycle every year, and is by no means easily kept at bay. It is believed that except in temperatures below 40° and above 77° F., it is always present, ready to pounce upon a weak potato plant, and liable to develop into an epidemic should the climatic conditions be favourable to fungus-life. These conditions are damp, dull, calm weather, and a moist or wet soil, with a vigorous crop, vigorous stems, leaves, and tubers, especially after a crop which has been attacked by the disease; planting varieties which have been known to be exceptionally successful in resisting the disease; growing the potato crop under such general cultural, sanitary, and manorial conditions as will ensure to the fullest extent possible the healthy and vigorous development of the crop; careful selecting and storing of potatoes to be used as seed; and dressing the potato-tops, both before and after the appearance of the disease, with sulphate of copper. No certain preventive measures have as yet been discovered, but all these measures have been carried out with advantage. The discovery of the copper remedy is likely to be of great importance to potato growers. This is the mixture—about 3 to 6 parts of sulphate of copper and quicklime to 100 parts of water—which proved so efficient in combating the allied parasite fungus, Peronospora infestans, that attacks the vines, and there is good reason to believe that it will be almost equally successful in averting the potato disease. It is well known that a vigorous variety of potato is much better able to withstand a disease than one that is weak, and its healthy development is most successful in resisting the fungus. It is with the potato as with a human being— deprive it of wholesome food and healthy sanitary surroundings, and disease will speedily ensue. The prevalence of this particular disease in recent years is a sure indication of a deterioration in the constitutional vigour of the cultivated potato. The other diseases from which the potato crop is liable to suffer are Curit, Scab, Dry Rot, Wet Rot, and a fungus known as Puccinia potanae, all of which affect the foliage and general health of the potato-plant, and does not seem to be necessarily connected with the presence of any vegetable parasite or insect enemy.—Scab is a disease of the tuber, which becomes covered with brown, oblong, and finally confluent and circular spots, causing an offensive smell when the surface is powdered with minute olive-yellow grains, a fungus called Tuberculinus scalae, of the division Hyphomycetes.—Dry Rot is also ascribed to the growth of a fungus of the same order, Fuscoporia solani, and attacks the tubers either when stored in a dark, damp, or light, but not damp, atmosphere. It was first observed in Germany in 1830, and caused great loss in that country throughout many years. The tissues of the potato-tuber become hard-ened and completely filled with the mycelium

Section of potato leaf, lower surface uppermost, showing: a) hair of the plant; b) epidermal cells; c) hydride, or thread of the fungus Phytothornia infestans; d) tinea, conidia or dust spores; e) spores; f) spores breaking to liberate the conidiospores; g) anthereis or male portion, and h) oogonia or female portion, of a fungus in the central tissue of the leaf, but whether portions of the Phytothornia, as once asserted, or of another fungus, Pythium, is doubtful (Corduner's Chronicle, 1891).
of the fungus, which at last bursts forth in little cushion-shaped tufts loaded with fruiting-spores.—Wet Rot differs from dry rot in the tufts becoming soft and rotten instead of hard and dry, and is always characterised by the presence of a fungus referred to Fries to his genus Perioba, but which Berkeley regards as another form or stage of the same fungus which causes or is inseparably connected with dry rot. Both dry and wet rot have often been observed along with the potato disease, which, however, is always characterised by the presence of another peculiar fungus.—Peziza postuma has occasioned heavy losses, chiefly in Ireland, by destroying the leaves before the crop has matured. See books on potato-culture by Pink (1879), Cox (1880), Fremlin (1883), and Ward (1891), and on the potato-bleight by Bravender (1880).

Potato, Sweet. See Sweet Potato.

Potato-beetle. See Colorado Beetle.

Potato-fly (Anthomyia tuberosa), a dipterous insect of the same genus with the Radiish-fly, Cabbage-fly, Turnip-fly, &c. In its perfect state it is known, like the House-fly. The maggots are often abundant in bad potatoes in autumn, and are different from the maggots of the House-fly, being hairy, bristly, and tawny; the long tail ending in six long bristles. The pupa is very like the larva.

The Potato-fly (Anthomyia tuberosa):
1. Larva, or maggot, natural size; 2. larva magnified; 3. Potato-fly.

Curtis) and the caterpillar of the Death's-head Moth (Acherontis atropos, Linn.) feed on the leaves and stems of potatoes, but rarely do serious damage.


Potemkin, GREGORY ALEKSEDOVITCH, the most celebrated of the Empress Catharine II.'s favourites, was born near Smolensk on 16th September 1739, the descendant of a noble but impoverished Polish family. Having entered the Russian army, he managed (1762) to attract the notice of the czarina by his handsome face and athletic figure; he was attached to her household, and in 1774 was preferred as her recognised favourite. From 1776, when the Emperor Joseph of Austria made him a prince of the Holy Roman Empire, till the year of his death he was the director of the Russian policy in Europe. It was at his instigation that the khans of the Crimean put himself (1783) under Russian protection. Four years later Catharine paid a visit to his government in the summer of 1787, which he then played off on his sovereign is described by De Ségr (Mémoires). He caused an immense number of wooden painted houses to be constructed, and grouped into towns and villages along the route the czarina was to take, and hired people to act the part of villagers and the像ants, tradesmen, and agriculturists, engaged in their various pursuits. The czarina's vanity was hugely gratified at the seeming improvements of the country under her rule, and she covered Potemkin with titles and honour. Almost immediately after this a war broke out with the Turks, and Potemkin was placed at the head of the army, with Suwaroff as his subordinate. The latter was taken after a terrible siege, and Suwaroff won the great fights of Bender and Ismaili—which of all which Potemkin reaped the credit when he entered St. Petersburg in triumph in 1791. That same year he was seized with sudden illness whilst travelling between Moscow and St. Petersburg, and died on October 15, and was buried at Kherson. He was a man of considerable ability in court intrigue and statesmanship; his skill as a general has been both affirmed and denied. Personally he was licentious, coarse in his habits. and utterly tyrannical and unscrupulous; in spite of his lavish extravagance he heaped up an immense fortune.

See Memoirs (Lond. 1812), and the Life in German by his secretary Saint-Jean (new ed. Karlsruhe, 1888).

Potential, in dynamical science, is a quantity of peculiar importance. Its value, as a mathematical function of the theory of attraction, was recognised by Laplace in the Mécanique Cosmique. The name was, however, given by George Green (1793–1841) in 1828, when its broad dynamical significance was for the first time explicitly stated and powerfully developed. The theory of potential is capable of developing the dynamics of what are known as Conservative systems. When such a system is made to pass from one configuration to another, the work done against the forces of the system depends only upon the initial and final configurations, and in no way upon the particular series of changes by which the passage is made. For instance, the work done against gravity in lifting a given mass to a height of 500 feet is exactly the same whether the mass is lifted vertically up, by a balloon, say, or more laboriously taken up the character of the course taken. We know that the work so done is lost and cannot be recovered in dynamic form (see ENERGY). These forces are in short dissipative, and so far as their action is concerned the system is not conservative, and the theory of potential does not apply. Further consideration will show that when the forces are functions of distances only the system will be conservative. Such forces then have a potential; and, although this does not exhaust all types of conservative systems which have a potential, it includes all that are certainly known to occur in nature around us. The force of gravitation and the force between electrified or magnetised bodies evidently belong to the category just described. In all such cases the potential at any point in the field of force is a definite function of the position, a mathematical expression having for any particular case a definite value, such that the difference of the potentials of two points measures the work done in carrying unit quantity (of matter, electricity, magnetism, &c.) from one point to the other (see Ex hấpition). This will depend upon the character of the course taken. We know that the work so done is lost and cannot be recovered in dynamic form.
POTENTILLA

differentiation in any chosen direction gives the force in that direction. It is obvious that other directed quantities besides forces may be expressible as the differential coefficients of a single non-directed or scalar quantity. Thus, in the mathematical theory of Hydrodynamics (q.v.) a very important directed quantity is that of motion which have a velocity-potential and motions which have not. In the former the velocity can be represented by a space differentiation of a scalar quantity; in the latter it cannot. See Vortex for an account of fluid motion, which has no velocity-potential.

POTENTILLA, a genus of plants of the natural order Rosaceae, sub-order Potentillae, differing from Fragaria (Strawberry) in the fruit having a dry instead of a succulent receptacle. The species are very numerous, natives chiefly of northern temperate regions, and some of them the coldest north; most of them perennial herbaceous plants, with yellow, white, red, or purple flowers, and pinnate, digitate, or ternate leaves. They are often called Cinquefoil (Fr., ‘five-leaved’); and some of the species are favourite garden flowers. A few are natives of Britain; one of the rarest of which is a shrubby species (P. fruticosus), forming a large bush, with pinnate leaves, and a profusion of yellow flowers, often planted in shrubberies. P. reptans, a common British species, with creeping stems, digitate leaves, and yellow flowers, once had a high reputation as a remedy for diarrhea, from the astrigent property of its root, of which most of the species partake with it. But P. anserina, a very common British species, popularly known as Silverweed, having creeping stems, yellow flowers, and pinnate leaves, which are beautifully silky and silvery beneath, has an edible root, with a taste somewhat like that of the parsnip. Swimmers may grab it up with avidity, and it was once much esteemed as an article of food in some parts of Scotland, particularly in the Hebrides, where it abounds and has been a resource in times of famine.

The name potentilla is said to be derived from the Latin potentia, powerful, or able to manifest virtual power. Tormentil (q.v.) is sometimes referred to this genus.

Potencia (anc. Potentia), a town of South Italy, ensconced in a valley of the Apennines, 103 miles E. by S. of Naples. It is surrounded by a wall, has a large and well-preserved fortification. Potencia was shaken by earthquakes in 1723, 1812, and 1857. Pop. 17,978.—The province of Potenza, called Basilicata until 1871, has an area of 3998 sq. m. and (1889) a pop. of 565,309.

Pot-herbs are not, as might be supposed from the name, the vegetables chiefly used for culinary purposes, as supplying articles of food; but rather those subsidiary in taste, and valued chiefly for flavouring, as parsley, fennel, &c.

Pot-holes. See GIANTS' KETTLES.

Poti, a seaport of Russian Caucassus, stands at the mouth of the river Poni, on the eastern shore of the Black Sea, 200 miles by rail W. of Tiflis. Here maize (£242,000), manganese (£85,000), &c. are shipped to the annual value of £300,000. The imports do not exceed £2500. Poti was seized by Russia in 1828. Pop. 3112.

Potidrea, a Corinthian colony founded on the westernmost isthmus of the Chalcidice peninsula in ancient Macedonia. By its revolt from the Athenian League (432 B.C.) it brought on the Peloponnesian war; it was besieged and taken by the Athenians (429 B.C.). The Athenian colony which was then settled there was destroyed by Philip of Macedon (356 B.C.). Cassander built up a new town, and called it Cassandria; this flourished greatly until it was captured and sacked by the Huns.

Pot-metal. Tap and pot metals are alloys of copper and lead. The proportions of the two metals vary from equal parts of each to 1 of copper and 10 of lead.

Poto mac, a river of the United States, formed by two branches which rise in the Allegheny Mountains in West Virginia, and unite 15 miles SE. of Cumberland, Maryland, from which point the river flows in a generally south-easterly course 400 miles, and falls into Chesapeake Bay, after forming a very nearly 100 miles long, and from 21 to 7 miles wide. The largest ships can ascend to Washington, and the tide reaches Georgetown. A few miles above Washington the river forms a catarract 33 feet high; and between there and Westport it falls more than 1000 feet. The scenery in this portion of its course is wild and beautiful, especially where it breaks through the Blue Ridge at Harper's Ferry. Its principal affluents are the Shenandoah, Cacapon, and Monacacy. The Potomac forms the greater part of the boundary between Virginia and Maryland.

Potoro, or Kangaroo Rat (Haplogrurus), a genus of the hopping, rabbit-like kangaroos. None of the species are larger than rabbits. They feed on roots, for which they dig with their fore-feet. Two other genera, Bettongia and Hopligrurus, are nearly related.

Potosi, capital of a department of the same name, and one of the most famous mining-towns of South America, stands in a barren and barren district, nearly 50 miles SW. of Chuquisaca. It is built on the side of the Cerro de Potosi (15,381 feet), at an elevation of 13,000 feet above the sea, and is thus one of the loftiest inhabited places on the globe. The town has a circumference of some 4 miles; but fully one-half is composed of tottering and ruined buildings, uninhabited and desolate, and the whole place, with its squalor, dilapidation, and dirt, presents a sinister aspect. The public buildings include a handsome cathedral and a mint which employs 200 hands; and the reservoirs are also worthy of mention. The streets are short and narrow, and there are no wagons or carriages, but only llamas and mules. The climate is very trying; all the four seasons may be experienced in one day, but usually it is bitterly cold, owing to the elevation and to the mountains all round, from which the snow nevercever melts. Yod-rapiches, card-shaves, &c. But it also, and originally, signifies a dish of different sorts of viands, and
POTSDAM, chief town of the Prussian province of Brandenburg, and second residence town of the royal family of Prussia, is situated on an island beside the lake-like river Havel, 18 miles by rail SW. of Berlin. It is a handsome city, with broad streets, public gardens, adorned with statues of Prussian sovereigns and fine squares. The royal palace (1667-1701), in the park of which are statues of Frederick-William I., Alexander I. of Russia, and Generals Blicher, Greisenau, Kleist, and Tauenzen; the town-house, a copy of that at Amsterdam; and the military orphanage are the finest of the public buildings. The Garrison church, with a steeple 290 feet high, contains the tombs of Frederick-William I. and Frederick II.; and the Friedenskirche the tombs of Frederick-William IV. and the Emperor Frederick III. The Brandenburg Tower {Tranjer's Tower} and the Neuer Turm of the immediate neighbourhood of the town are more than half-a-dozen royal palaces, as Sans-Souci (1745-47), the favourite residence of Frederick the Great, surrounded by a splendid park and gardens, containing Rauch's monument to Queen Louise and the palace of Friedelshack, formerly the New Palace (1763-70), with nearly 200 rooms, many of which contain costly works of art; Charlottenhof, built by Frederick-William IV. in 1820; the Marble Palace, the summer residence of the Emperor William II.; and Babelsberg, the private property of the same prince. Potsdam has an observatory, and a cadet and other military schools. Its manufactories produce sugar, chemicals, harness, silk, waxcloth, beer, &c. Flower-gardening, especially of violets, is a busy industry. Among other buildings in the palace grounds are the Pop. Garden, 53,727, opened by the Garrison church, 1800, including the Garrison church, 1800, which contains a creation as a town to the Great Elector, Frederick-William, and to Frederick II. Prior to that period it was a fishing-village, built on the site of an ancient Slav settlement. See German works by Kopisch (1864), A. R. (1883), and Sello (1888).

Potsdam Beds, a name given in North America to the uppermost division of the Cambrian or Primordial strata.

Potstone, Latpis Ollaris of the ancient Romans, a massive variety of tale-schist, composed of a finely-felted aggregate of tale, mica, and chlorite. It is generally of a grayish-green colour, sometimes dark green. It occurs massive, or in granular concretions. It is soft and easily cut when newly dug up, greasy to the touch, and insubstantial even before the blowpipe. It becomes hard after exposure to the air. It is made into pots and other household utensils, which communicate no bad taste to anything contained in them, and when greasy are cleaned by the fire. It was well known to the ancients; and Pliny describes the manner of making vessels of it. It was anciently procured in abundance in the Isle of Siphnos (Siphanto), one of the Cyclades, and in Upper Egypt. Large quarries of it were wrought on the Lake of Como, from about the beginning of the Christian era to 23th August 1618, when they fell in, causing the destruction of the neighbouring town of Pleurs, in which it was wrought into culinary greens, &c. It was carried to the Valais, Moravia, Norway, Sweden, Greenland, near Hudson Bay, &c.

Pott, August Friedrich, a great philologist, was born at Nettrelide in Hanover, 14th November 1802. He studied philology at Göttingen, habilitated at Berlin in 1830, and in 1833 became extraordinary, in 1839 ordinary professor of the Science of Language in the university of Halle. Next to W. Humboldt, Bopp, and Grimm, the name of Pott stands prominent in the new science of comparative philology. The fame of his researches was from the first secured by his Etymologische Forschungen auf dem Gebiet der Indogermanischen Sprachen (2 vols. 1833-36; & 2d ed. 6 vols. 1859-76), a work second in importance only to Bopp's Comparative Grammar. His work on Germanisch, in Ersch and Gruber's Encyklapdie, is a masterpiece of condensation, and for once of order. For his setting forth was a lack of order and perspicuity, which made Ascoli compare his books to the plain of Shinar after the confusion of Babel had taken place. But no student ever brought to his studies a loftier spirit of devotion, or collected more massive materials for the foundation of a new science. So thorough was his treatment that all the progress of learning since has not stripped the fragments from the foundations on which Pott's Names, on Numerals, his essays on Mythology, African Languages, or General Grammar. He died at Halle, 5th July 1887, working to the last.

Pottawattamies, a tribe of American Indians, belonging to the Algonquin stock. The early French settlers established a mission amongst them at Green Bay, and to this day many of them are Roman Catholics. They sided with the English both during the Revolution and in the war of 1812, and afterwards settled in Kansas, where one band of over 400 now live in houses and cultivate the ground. Another band, nearly 500 strong, is on a reservation in the same state, under the care of the Society of Friends.

Potter, John D.D., an English scholar and divine, the son of a linen-draper of Wakefield, in Yorkshire, was born in 1674, studied with great diligence and success at Oxford, where he took his degree of M.A. in 1694, and in the same year received holy orders. He was appointed chaplain to Queen Anne in 1706, professor of Divinity at Oxford in 1708, Bishop of Oxford in 1715, and finally in 1737 attained the highest dignity in the English Church—the archbishopric of Canterbury. He died 21st October 1747, and was buried at G oven. Potter's principal work is his Archologia Graeca ('Antiquities of Greece,' 2 vols. 1698), not superseded until the appearance of Dr W. Smith's Dictionary of Greek and Roman Antiquities; besides which, however, we may mention his edition of Lyceophone (1697) and of Cnossus Alexandrinus (1715).

Potter, Paul, the greatest animal-painter of the Dutch school, was born at Enkhuizen in 1625, and was the pupil of his father, Pieter Potter, a landscape-painter, with whom in 1631 he came to Amsterdam. He was also an excellent etcher, and possessed the most exquisite taste in his etched pieces, The Herdsman (1640, life-size), The Shepherdess (1642), and The Wood-Hawk (1643 and 1644 respectively. He established himself at the Hague in 1649, where next year he married the daughter of an architect, but in 1653 he returned to Amsterdam. He died there in January 1654 at the untimely age of twenty-nine. His
best pictures are pastoral scenes with animal figures, the life-size ‘Young Hull’ (1647, at the Hague) being especially celebrated. His ‘Dairy Farm,’ measuring only 19 by 48 inches, was sold in London on 27th June 1890 from the Stover collection for £6000, or £13 per square inch. The Rijks Museum at Amsterdam possesses several pictures of this ‘Dairy Farm’ and seven other pictures from his easel. Very many of his productions are preserved in England.

See P. Potter, an Vie et ses Oeuvres, by Van Westriëne (the Hague, 1867), and Cundall, Landscape Painters of Holland (‘Great Artists’ series, 1881).

Potters, The, a district in North Staffordshire which is 3 miles broad. The centre of the earthenware manufacture in England, includes Hanley, Burslem, Stoke-upon-Trent, Newcastle-under-Lyme, Tunstall, and other towns.

Pottery. This term, derived through the French poterie from the Latin pota, ‘a drinking vessel,’ is applied to all objects of baked clay. Pottery may be said to be almost contemporaneous and co-extensive with mankind; it is found with the earliest remains of the most primitive races, and it is fashioned amongst the rudest of present day tribes. The art in its rudimentary condition—merely moulding wet clay into the desired form, and submitting it to the hardening heat of the sun or of fires, in order to be rendered impervious to the least touch of savagery. The universality of the primitive art, and the many different lines along which it progressed, preclude the possibility of tracing its history in chronological sequence, and only a few of its more important developments can be traced historically.

Pottery as known at the present day is distinguished into many classes according to the nature and purity of the clay employed, the heat to which it has been exposed in firing, the glazes or enamels with which it has been covered, and the coloured or other ornamental treatment of its surface. Briefly, as regards material and baking it may be divided into (1) earthenware, which, exposed to a comparatively low heat, remains earthy in texture and can be scratched with a steel point; (2) stoneware, fired at a high heat, hard, dense, compact, and not scratched by the blade of a knife; (3) porcelain, fired at the highest temperature, semi-fused and vitreous in structure, and, when sufficiently thin, translucent. Earthenware again may be subdivided according to the manner in which its surface is treated, being either (1) plain, as in an ordinary flowerpot; (2) of Astbury, black surfaced pottery of ancient Greece; (3) glazed or coated with a transparent glass or varnish; and (4) enamelled or coated with an opaque white or coloured glass, which completely conceals the body over which it is spread.

Manufacture.—The dough-like condition into which clay can be worked with water, and the hardness and indestructibility it acquires by burning, are the qualities upon which the potter’s art essentially depends. Clay is one of the most metallic substances known, but it is of many qualities and degrees of purity. The commonest brick clays are so coarse in texture and so impregnated with iron and other foreign ingredients that they can be used only for bricks, tiles, and the very coarsest kinds of pottery. The purest potters’ clay, known as clays or kaolin (q.v.), is formed by the decomposition of granitic rocks. It consists essentially of the hydrated silicate of alumina with small proportions or trACES of one or more of lime, potash, soda, and magnesia. The finest china-clay of Great Britain is at Port Sunlight, Wirral, where it was discovered at Carlclaz, 2 miles N.E. of St Austell, between 1758 and 1758 by William Cookworthy.

Cookworthy’s discovery was of the utmost importance for the homoe manufacture of porcelain and fine pottery; and the development of the industry which took place under Josiah Wedgwood and others was due in no small measure to the fine material which thus became available to them. Commoner potters’ clay or pipeclay is obtained principally from Poole in Dorsetshire. The materials used for the paste or body of different varieties of porcelain and pottery are as follows: (1) Porcelain.—At Sévres, kaolin, 48 parts; sand (pure white), 48 parts; chalk, 4 parts. At Dresden, kaolin, 62 parts; flint, 38 parts; broken biscuit-porcelain, 2 parts. At Berlin, kaolin, 76 parts; telspar, 24 parts. In England three mixtures are used: for common china, ground flints, 75 parts; calcined bones, 150 parts; china-clay, 40 parts; clay, 70 parts. For fine china, ground flints, 66 parts; calcined bones, 160 parts; china-clay, 90 parts; Cornish granite, 80 parts. Fine, for modelling figures, &c., Lynn sand, 150 parts; calcined bones, 300 parts; china-clay, 100 parts; potash, 107 parts. The glazes require to be varied for nearly all, so that their fusibility may be greater or less, according to the more or less fusible character of the biscuit ingredients. (2) Stoneware, such as is used for jars, bottles, drain-pipes, &c., is made of several kinds of plastic clay, mixed with felspar and sand, and occasionally a little lime, but the materials vary much in different localities. (3) Earthenware. A labelled earthenware is made of various kinds of clay, varying in colour from yellow to white, according to the quality required; and more or less of powdered calcined flints are mixed with it, to give it body and hardness. Sometimes, as in porous vessels, only clay is used.

The use of calcined flint was first adopted by a Burslem potter named John Astbury, who in 1720 noticed the fine white character of a powder applied to the eyes of his horse for the cure of some ailment. He learned that the powder was made from calcined flint, and thereon he conceived the idea of using it in his pottery; and did so with great success. The ingredients, such as the clay and calcined flints, are prepared by separate means, the former in the pug-mill, which is represented as at C in fig. 1. This is an upright, iron-bound, wooden cylinder, with an axis, A, turned by machinery; projecting from the ceiling, as at D, are three arms, b, each of which has three knives fixed in it, with the points outward, and so arranged that they spread over the largest amount of space in the interior; and altogether they are placed in a spiral manner, that they may substitute in motion the clay, which is thrown in humps into the hopper-shaped upper part of the vat, is worked down, and is so cut and kneaded by the knives that it is forced out of the pug-mill in a state of soft pap. This is aided by the knives on the lower part of the lowest arm being connected together by a plate, D, which prevents all settlement at the bottom. This pap-like clay passes into a large wooden tank, in which it is agitated with water until quite incorporated, so as to resemble milk in colour and consistency. In another mill (fig. 2), of
a different construction, the Cornish granite and calcined flints are reduced to a somewhat similar state. This mill is very strongly constructed, and consists of a tub-like vat, A, in the centre of which turns an axle, B, moved by machinery; in the bottom of the vat is a thick stone-bed, C, consisting of either chert or horn stone. From the upper part of the axis three strong arms, D, D, D, project like the spokes of a wheel; and strongly attached to these are stout beams, a, pointing downward, and nearly touching the stone-bed, C. As the axis, with its arms and beams, turns round, the beams push some large masses of the Cornish granite or of chert stone round with them, and these triturate the calcined flints and other hard materials, and stir up the water with which the vat is kept constanty supplied, whilst it overflows in a milky state, charged with the finely-divided materials, into a cistern, where it is kept stirred until it is sufficiently supplied with the solid materials, and the thickened milky liquid is then drawn off, in proper proportions, into a vat to which the prepared clay is also passed. The mixture of the two is then allowed to subside until the water is nearly clear, when it is drawn off; and the sediment is deprived of its surplus moisture, either by evaporation, or, in the best works, by a pneumatic exhausting apparatus, which does it very quickly. The composition is then a fine plastic material of the consistency of tough dough, and is ready for the potter’s use. In preparing the finer materials for porcelain many other operations are required, all, however, having the same object—viz. the extreme minute division of the substances used.

The prepared clay is taken to the throwing-machine, or potter’s wheel, which is represented in fig. 3. This consists of a fixed table, A, through which passes the axle, B, and rises a little above its surface, and having on its upper end a disc, C, which revolves with it. The axle is put into rapid motion by turning the fly-wheel, D, either by hand or machinery; and this causes a rapid revolution of the disc, C, upon which is placed the soft mass of clay to be moulded. At E is seen an upright, with a small sliding-bar regulated by a screw; this is the guide for the potter to regulate the height of the vessel he is making. When the lump of clay is revolving, the potter, with his hands or with proper tools, fashions it into any rounded form he desires, gradually working from the base upwards till the vessel in his hands attains the external shape, height, and thickness of wall required. It is then put aside for some time to dry, and when in a state of greatest doughly tenacity it is fixed on a turning-lathe, and by means of sharp steel tools its surface is accurately turned and smoothed. But some articles are formed in moulds, the moulds being made of plaster of Paris. This answers well for fine porcelain intended to be very thin, because the plaster-mould absorbs much of the moisture in the paste, and thus partially dries it, so that it admits of handling, which in a softer state would be very difficult. The paste is used so liquid that it can be poured into the moulds. It is usual, in casting, to have a mould for each part, as seen in figs. 4, 5, 6, which represent the body, neck and lip, and foot of the creamer, fig. 7. The handle is also separately moulded, and attached with the aid of a fluid clay paste, called a slip. For nearly flat articles, such as dinner-plates, a plan is adopted which combines both processes: a mould, usually of plaster, fig. 8, a, is placed on the disc of the throwing-wheel, b, and a thin layer of the paste is pressed on to it, so as completely to take its form; then to the guide-post, c, is attached an arm, d, with a small brass plate,
heating of the pieces, and also protect them from smoke. A kiln has generally eight furnaces, and it is usual to raise six piles of seggars between every two furnaces, or rather between their flues, which rise to a considerable height in the kilns. Each pile of seggars is technically called a *bung*, so that there are generally forty-eight or fifty bungs to the charge of a kiln. When all this is arranged the furnaces are lighted, and great care is taken to

use the best coal, as it enables the manufacturer to make a more certain calculation as to its effects, and is less liable to smoke and sulphurous vapours, which might injuriously affect the contents of the kiln. The baking or firing usually lasts from forty to forty-two hours. The fire is then allowed to go out, and the kiln to cool very gradually, after which it is opened, and the seggars removed, to be unpacked in a separate workshop.

The articles are now in the state called biscuit-ware, and are ready for any pattern they may be intended to bear, and the glaze. Here, however, it may be stated that it is possible to glaze refractory pottery, such as stoneware in the biscuit oven, and

thus avoid the necessity for two firings to the ware. The glazing is in this case effected by throwing common salt into the oven when at its highest temperature. The salt is volatilised and the sodium separates from the chlorine, and, combining with the silica it finds in the heated ware, forms a
true soda glass with it, which makes a uniform transparent glazed layer over all the pottery surfaces which it reaches. In this way all glazed sanitary wares and ordinary stoneware jars and bottles are made at one firing. Common pottery is often figured by printing the desired pattern in enamelled colours on transfer-paper, and, whilst the printing is still wet, applying it to the biscuit-ware; the ware absorbs the enamel ink, and the paper is recovered by soaking the cloth in water, leaving the pattern on the ware. It is next fired in seggars, or a muffle, to fix the colour, and is then dipped into composition called glaze, of which three kinds are used in the Staffordshire potteries. The first, for common pipeclay ware, is composed of Cornish granite, 16 parts; flint, 30 parts; white-lead, 53 parts; and encault, or broken flint-glass, 4 parts. These materials are triturated with water, with the same care and by similar means to that employed in forming paste, and are reduced with water to the same milk-like liquidity. Each workman has a tab of the glaze before him; and as the articles of biscuit-ware, either with or without decorations, are brought to him, he dips them in the glaze, so as to ensure a uniform coating over them; and by nice management he prevents any large drops or accumulations on one part more than another. The porous biscuit-ware rapidly absorbs the moisture, and dries up the thin film on the surface of the articles, which are again placed in seggars, and carried to the glaze-kiln, where they undergo another firing, which melts the glaze, and converts it into a transparent glass all over the surface, and renders any pattern previously printed upon it very plain. The temperature in the glaze or enamel kiln is not increased very gradually, and is kept up for about fourteen hours, after which it is allowed to cool slowly, and the articles are taken out completed. So far, this description has applied to the manufacture of pottery and porcelain on a large scale, for general purposes; but when it is applied to more costly and artistic works very special arrangements are required; and in the case of remarkably fine pieces, instead of the huge kilns, which hold frequently many thousands of pieces, small furnaces (fig. 14) are used for each separate article for the biscuit, the glaze, and the enamelled gilding. These, in porcelain, are applied on the glaze, and not on the biscuit.

In the decoration of painted pottery and porcelain the colours employed are coloured glasses ground to impalpable powders, and mixed with borax or some other fluxing material, on which they are generally made liquid with oil of spike, and they are laid on with hair-pencils, in the same way as oil-colours. The whole process is exactly the same as in painting or staining glass; the glaze on the biscuit-porcelain being true glass, and the enamel colours being exactly the same as those used by the glass decorator. The colours may be made by mixing the materials of which glass is made with the colouring materials in enamelled colours on transfer paper, and the article is then dipped into the already coloured glass and the flux. When the former plan is employed the principal colouring materials made use of are oxide of chromium for green; oxide of iron for red, brown, violet, gray, and yellow; oxide of uranium for orange, yellow, and black; oxide of vanadium for green and purple; oxide of cobalt for blue, gray, and black; oxide of antimony for yellow; oxide of titanium for yellow; oxide of copper for green; suboxide of copper for red; sesquioxide of iridium for fine black; protochrome of iron for brown; chromate of lead for yellow; chromate of barytes for yellow; chloride of silver for deepening reds and purples; purple of Cassius for ruby and purple. Several of these colours are much increased in brilliancy by the addition of oxide of zinc, which of itself gives no colour; and the transparent ones are rendered opaque by the addition of oxide of tin.

Other fluxes besides borax are used—as sand, felspar, boracic acid, minute or litharge, salt, salt-petre, potash, and soda. For the gliding of pottery gold-leaf is rubbed down with oil of turpentine; or metallic gold or powdered bismuth is added to the melt from its solution. The finely-divided gold so obtained is washed and dried, and then worked up with one-sixteenth of its weight of oxide of bismuth and oil of turpentine, painted on, fired, and afterwards burnished.

History.—The most ancient pottery of which we have any trace consists of the rude clay urns, vases, and other vessels found in the tombs of the prehistoric races. These remains exhibit the art of the potter in its most elementary condition, yet they are not devoid of elegance of form, and the decorative instinct of primitive man found appropriate expression on them in bands of incised lines forming lozenge, zigzags, and other geometrical forms, and in impressed wavy cord marks, &c. See LAKE-DWELLINGS, STONE AGE, TROY.

Egypt.—If we except the races of the far East, it is to the Egyptians among historical nations to whom precedence must be assigned in the art of the potter. We know that at a very remote period people made bricks of sun-dried clay cementsed with straw, which were sufficient for the purposes of construction in a country where there is scarcely any rainfall. Vases of baked earthenware were also in use at the earliest period of Egyptian civilization, and glazed tiles are preserved which belong to the epoch of Ramesses III., not long after the exodus of the Israelites from Egypt. That the Egyptians attained considerable skill as potters is attested by the lustrous red ware they made for holding perfumes, wine, honey, and other delicacies; but their most remarkable pottery was their so-called porcelain made of a fine sand or frit covered with a thick silicious glaze, blue, green, white, purple, or yellow in colour. The blue colour—which is that principally employed—was produced by an oxide of copper which yielded tints of unrivalled beauty and fineness. This was fashioned into vases, sepulchral figures of deities, scarabeae, beasts, &c.; and it must have obtained such estimation that it was found in most of the ancient countries which had commerce with Egypt. The unglaIZED Egyptian pottery (fig. 15) illustrates the fact, also attested by
early Greek vases, that the vase as well as the
statuary figure had its origin in the human form.
On these early vases the head, body, and limbs are
figured, and the body of the vase is only an exaggerated
human trunk.
Assyrian.—In the contemporary
empires of Assyria and Babylon
pottery was also in use at an early
period. Sun-dried and kiln-dried
bricks were made about 2000 B.C.,
and like Egyptian bricks these were
stamped with the names and titles
of the reigning monarchs, and the
locality for which they were destined.
Glazed bricks of various colours,
occasionally enlivened with figures of
men and animals, were introduced
into constructions, and Semiramis is
said to have adorned them with the walls of
Babylon. In these bricks we have the earliest
example of the employment of materials for colouring
like those now in use. The glaze, however, is
silicious. Glazed polychromatic bricks were also
used in the construction of the walls of the palace of
King Darius, the contemporary of the prophet
Daniel, at Susa (scriptural Shushan). These
bricks varied so as to be set together into
regular geometrical patterns, colossal figures of
men, &c. in high relief. The objects most remark-
able for size are the large coffins found at Warka,
supposed by some to be the ' Ur of the Chaldees.'
The Assyrians and Babylonians used terra-cotta for
historical and legal purposes, making cylinders,
hexagonal prisms, tiles and tablets of it, on which
were impressed extensive writings in the cuneiform
character. Some of the most remarkable of these
tables contain an account of the campaign of
Sennacherib against Judah and the tributes of
Hezekiah; others give a record of the flood, the
creation, &c. See BABYLONIA.
Phoenician.—Contemporaneously the Hebrews and
Phoenicians practised the art, but of purely
Hebrew work few traces remain. Phoe-
nician pottery, however, has been abund-
antly excavated in Cyprus, and may be
taken as a type of the works of both
peoples. It is principally of a cream colour
and of a brick red body, ornamented in
horizontal bands, with lines in amber and
red, concentric circles, and other geometri-
cal forms being the most common deco-
ration. They also moulded rude figures of
deities and of domestic animals, the latter
having apparently been used as toys by
children.
Greek.—The most remarkable pottery
of antiquity was the Greek, which seems in
its earliest development to have had
a certain affinity with Phoenician products.
The Greeks claimed the invention of the
potter's wheel, and the principal cities
contested the honour of the art, which is
mentioned in Homer and attributed to
Correhus of Athens, Hyperbius of Corinth,
or Talos the nephew of Dedalus.
The Greek vases which remain to this day, prin-
cipally recovered from tombs in Greece and in the
lands to which its commerce reached, show
that within a few centuries the art rose from
the rude condition like that shown in prehistoric
pottery till it reached a perfection and variety of
form and a grace and dignity of decoration not
since attained by the efforts of any people. It was
the triumph of pure art, for the material of which
the body of Greek vases is fabricated is of the
commonest type, and the colours the artists had
at their disposal were few and simple. The archaic
pottery of the Greeks down to about the 7th
century B.C. was like the rude earthenware of
prehistoric times. Their first improvement consisted
in the application of a brown glaze to the surface
of the ware, which enabled them to give to vases
the incised ornament, scratched through the glaze
into the differently coloured body. Next the
potters discovered black pigment which they could
apply over the brown glaze, and thus increase
their decorative resources by painting geometrical
patterns in black. By degrees the purely geometri-
cal forms of ornament were abandoned, and figures
of animals, rising ultimately to the human figure,
were painted in black silhouette on the vases,
some of the details being touched with white and
purple. In the case of the human figure faces and
limbs began to be expressed in white and colour on
the black figures painted on a red ground.
Consequently, the rough clay body of the vases began
to be wholly or partially covered with an engobe or
slip of clay of much finer quality and colour, the
engobe being applied by dipping the moulded
article into a vessel containing the slip. With
these developments in material and decorative
variety the forms of the vases and the skill of the
artist draughtsman show steady and continuas
development. Just as the best period in Greek
art approached the favourite method of vase
decoration underwent a total change. The decora-
tive figures, deities and men, were traced on their
red and white clay surfaces; but, instead of the
figures being filled up in black, the surrounding
space—the body of the vase itself—was blackened,
giving a black varnished background with figures
the colour of the underlying body. The details of
these figures are indicated with fine lines. Some-
times the faces and limbs are filled up in white, and
the draperies may be parti-coloured. At this stage
Greek pottery reached its greatest loveliness of
form and perfection of ornamentation, the drawing
being supremely refined, delicate, and spirited.
Among the most interesting of the Greek vases
which remain to us are certain of the Panathenic
amphora—prizes won at the public games in
Athens—on one side of which was painted an
archaic figure of Athens, and on the other any
appropriate design with the inscription:
ΤΑΞΙΑΝΟΕΝΟΡΟΑΘΗΝ." In most cases also they
contain the name of the archeon or chief-magis-
trate of the city for the year, in this way enabling
us to find the precise date of the manufacture. Of
these vases ten are in the British Museum, six of
which bear the name of the archeon, and the Louvre
possesses three, which, from the archon's names
they bear, can be referred to 323, 321, 313 B.C.
respectively. At this period the decadence of Greek art had already set in. The drawing degenerated speedily, figures were multiplied and crowded in confusion; ornament became coarsely superabundant, and the proportions of the vases became exaggerated and bad. Subjects themselves were no longer lofty and heroic, but connected with incidents of everyday life, with burlesque scenes, and with fancy.

In the history of Greek art no subject has excited more widespread interest within recent years than the terra-cotta figurines or statuette figures and groups found principally in tombs and about temples of the later period. From 1875 downwards a great number of such figures were excavated from tombs at Tanagra in Boeotia; subsequently a very important find was made at Myrina on the coast of Asia Minor, opposite the island of Mitylene, and at Tarentum, Corinth, the Crimea, Cyprus, the Cyrenaics on the African coast, and in other localities quantities of such figurines have been obtained. The Tanagra figurines were found in tombs which contained no painted vases; but some glass vessels, lamps, and inferior black pottery were associated with them, indicating that the statuettes belonged probably to the Christian era. The terra-cotta ware of the Ancient and Asian coast comes down to a period as late as the time of Septimius Severus. The objects from the Tanagra tombs consist principally of single figures and groups of draped females and young girls; subjects, drawn from the everyday life of the people, treated with true Artistic grace and simplicity, and with marvellous sculptural feeling. In the Myrina series, which obviously have a different inspiration, deities and heroes of mythology form the most important element—Apollo and Bacchus, Silenus, satyrs, and maenads frequently recurring. The figures are mostly polychromatic, sober, earthy colours, not fired in, having been used to tint them; but in some the colours are true enamel pigments. Miniature reproductions of known statuary figures and groups also occur among these exquisite works in terra-cotta.

Etruscan.—From the fact that much Greek pottery has been found in Etruscan tombs, this ware came to be popularly known as Etruscan pottery. True Etruscan pottery, however, was rarely painted. The most characteristic ware of that people, with a bright colour throughout, but covered with a lustrous siliceous glaze. The red colour nearly resembles in appearance and texture a coarse sealing-potter; the surface was often remarkably fine. The vases, generally of small dimensions, were turned on the lathe; the ornaments were moulded separately, and attached to the vase; patterns were produced by the repetition of the same mould, or by placing the bas-reliefs from various moulds on the vases. This kind of pottery was first made by the Romans at Arezzo, but subsequently, or nearly simultaneously, was produced at Capua and Cumae in the 1st century. It afterwards extended over all the Roman world, and was made in Gaul and Germany. While under the republic it was at first extremely fine, the manufacture deteriorated under the last of the twelve Caesars, and the ware is no longer found under the Antonines. The names of several hundred potters are found stamped upon existing specimens of this ware, some of them evidently of Gaulish origin. It was extensively imported into Britain and other remote provinces of the empire. In Britain the Roman conquerors established the manufacture of pottery in many localities, making use of the native clays. The ware was generally of inferior quality, but some objects were made of good red and white ware, and there are examples which are very rare in Britain, and it is said that some of them are of Oriental origin. It is said that in the time of the Severi, the underglaze colour was as bright as upon the surface, but afterwards it became dark, and the ware was not made at Rome in the 2nd century.

Roman.—The only important development made in pottery under Roman rule was this Aretine or Samian ware. It is evidently imitated in its decoration from works in metal, in all probability from the chased cups of silver and gold which began to come into use in Italy, and was a continuation of the later moulded wares of Greece and Italy. The Samian ware of the Romans, so called from having originated in the island of Samos, was of a bright red colour throughout, but covered with a lustrous siliceous glaze. The red colour nearly resembles in appearance and texture a coarse sealing-potter; the surface was often remarkably fine. The vases, generally of small dimension, were turned on the lathe; the ornaments were moulded separately, and attached to the vase; patterns were produced by the repetition of the same mould, or by placing the bas-reliefs from various moulds on the vases. This kind of pottery was first made by the Romans at Arezzo, but subsequently, or nearly simultaneously, was produced at Capua and Cumae in the 1st century. It afterwards extended over all the Roman world, and was made in Gaul and Germany. While under the republic it was at first extremely fine, the manufacture deteriorated under the last of the twelve Caesars, and the ware is no longer found under the Antonines. The names of several hundred potters are found stamped upon existing specimens of this ware, some of them evidently of Gaulish origin. It was extensively imported into Britain and other remote provinces of the empire. In Britain the Roman conquerors established the manufacture of pottery in many localities, making use of the native clays. The ware was generally of inferior quality, but some objects were made of good red and white ware, and there are examples which are very rare in Britain, and it is said that some of them are of Oriental origin. It is said that in the time of the Severi, the underglaze colour was as bright as upon the surface, but afterwards it became dark, and the ware was not made at Rome in the 2nd century.

Roman.—The only important development made in pottery under Roman rule was this Aretine or Samian ware. It is evidently imitated in its decoration from works in metal, in all probability from the chased cups of silver and gold which began to come into use in Italy, and was a continuation of the later moulded wares of Greece and Italy. The Samian ware of the Romans, so called from having originated in the island of Samos, was of a bright red colour throughout, but covered with a lustrous siliceous glaze. The red colour nearly resembles in appearance and texture a coarse sealing-potter; the surface was often remarkably fine. The vases, generally of small dimension, were turned on the lathe; the ornaments were moulded separately, and attached to the vase; patterns were produced by the repetition of the same mould, or by placing the bas-reliefs from various moulds on the vases. This kind of pottery was first made by the Romans at Arezzo, but subsequently, or nearly simultaneously, was produced at Capua and Cumae in the 1st century. It afterwards extended over all the Roman world, and was made in Gaul and Germany. While under the republic it was at first extremely fine, the manufacture deteriorated under the last of the twelve Caesars, and the ware is no longer found under the Antonines. The names of several hundred potters are found stamped upon existing specimens of this ware, some of them evidently of Gaulish origin. It was extensively imported into Britain and other remote provinces of the empire. In Britain the Roman conquerors established the manufacture of pottery in many localities, making use of the native clays. The ware was generally of inferior quality, but some objects were made of good red and white ware, and there are examples which are very rare in Britain, and it is said that some of them are of Oriental origin. It is said that in the time of the Severi, the underglaze colour was as bright as upon the surface, but afterwards it became dark, and the ware was not made at Rome in the 2nd century.

Roman.—The only important development made in pottery under Roman rule was this Aretine or Samian ware. It is evidently imitated in its decoration from works in metal, in all probability from the chased cups of silver and gold which began to come into use in Italy, and was a continuation of the later moulded wares of Greece and Italy. The Samian ware of the Romans, so called from having originated in the island of Samos, was of a bright red colour throughout, but covered with a lustrous siliceous glaze. The red colour nearly resembles in appearance and texture a coarse sealing-potter; the surface was often remarkably fine. The vases, generally of small dimension, were turned on the lathe; the ornaments were moulded separately, and attached to the vase; patterns were produced by the repetition of the same mould, or by placing the bas-reliefs from various moulds on the vases. This kind of pottery was first made by the Romans at Arezzo, but subsequently, or nearly simultaneously, was produced at Capua and Cumae in the 1st century. It afterwards extended over all the Roman world, and was made in Gaul and Germany. While under the republic it was at first extremely fine, the manufacture deteriorated under the last of the twelve Caesars, and the ware is no longer found under the Antonines. The names of several hundred potters are found stamped upon existing specimens of this ware, some of them evidently of Gaulish origin. It was extensively imported into Britain and other remote provinces of the empire. In Britain the Roman conquerors established the manufacture of pottery in many localities, making use of the native clays. The ware was generally of inferior quality, but some objects were made of good red and white ware, and there are examples which are very rare in Britain, and it is said that some of them are of Oriental origin. It is said that in the time of the Severi, the underglaze colour was as bright as upon the surface, but afterwards it became dark, and the ware was not made at Rome in the 2nd century.
It can be no doubt that the production of brilliant enameled pottery simultaneously in the East and the West—in Persia, Damascus, and Rhodes on the one side, and in the Spanish peninsula on the other, exeroused a powerful influence on the origin and progress of the same art in Italy. But there, under the contemporaneous renaissance of art generally, the decoration of the pottery assumed a distinctively European character, and it attained a much greater freedom, wealth, and variety of decorative resource than was reached by any of its predecessors. The use of the fine white enamel glaze yielded by tin in Italy first associated with the name of Luca della Robbia. The great sculptor, who employed it in coating his terra-cotta relief figures and groups, works which are now among the most prized treasures of art. From his time onwards the application of this tin enamel to earthenware became common in Italy, and it is to such pottery that the name Majolica properly belongs. One of the most famous of the many artists who produced this ware was Giorgio Andreaoli, commonly known as Maestro Giorgio, who worked at Gubbio during the first half of the 16th century. His pieces, Gubbio ware, are distinguished by a remarkable iridescence, flashing ruby, golden, and opaline tints of marvellous brilliancy with every variation of light. Among the most famous centres of Majolica production in Italy besides Gubbio were Pesaro, Urbino, Castel Durante, Diruta, Faenza, Forli, and Venice. The artistic value of the products declined with the waning of art in Italy in the 17th century.

France.—From Italy the art of making enameled ware passed with Catharine de' Medici into France, and the manufacture was established on Italian models in Nevers about 1590, and there it flourished till the end of the 17th century. But previous to that time the celebrated Bernard Palissy in 1555, after unhearkened exertions, had independently discovered an enamel glaze, which he applied to his characteristic rustic dishes, embellished with exquisitely moulded figures, in high relief, of fishes, reptiles, fruits, and other figures. But while Palissy was pursuing his investigations there was being produced in France a limited number of specimens of a ware which has become much more famous than the works of any other pottery, ancient or modern. During the last fifty years only attention has been prominently drawn to a few examples of pottery, very distin-

tive in form, exceedingly rich in decorative treatment, and highly original in the method by which it had been elaborated. At first it was known as Henri Deux ware, from many of the pieces containing the cypher and emblems of Henry II. and of Diana of Poitiers. Subsequently, owing to the acceptance of a false theory of its origin, it was designated Orin ware; but, after much investigation and many suggestions, it has been discovered that the pieces were made at St. Porchaire (Deux-Sèvres) between 1555 and 1566. Henri Deux ware consists entirely of decorative pieces treated in an architectural manner, the body of the ware being a creamy pipeclay, with inlaid ornamentation in colour, and beautifully modelled masks, trusses, &c., and a transparent glaze. Only sixty-five pieces are known, and when any now change hands it is at an enormous price. In the Hamilton

---

**Fig. 19.—Deep Dish, by Giorgio.**

**Fig. 20.—Palissy Dish, La belle Jardinière.**

**Fig. 21.—Vase of Henry II. Ware.**

The celebrated enamelled ware of Holland owes its origin to the attempts of the Dutch to imitate the oriental porcelain with which they were made familiar by their eastern trade and connections. The manufacture dates only from the 17th century, and from the fact that it was principally centred at Delft fine pottery came to be known generally in Britain as Delft.
ware or 'Delft.' To imitate the fine lustreous white of the ordinary porcelain body time-honoured glaze was employed by the Dutch potters, and their coloured decorations were in blue, and at first entirely oriental in character. Stoneware Bellarmines or Greybeards (q.v.), and the tall beer-jugs of the Germans, usually decorated with moulded ornaments, medallions and inscriptions &c, were stoneware, the spoken of as Grès de Flandres, are really almost exclusively of German origin, and may be traced, according to their colour and quality, to the neighbourhood of Cologne, Coblenz, and to Kressen in Bavaria, &c. Stoneware vessels of the same nature were also made in England early in the 18th century.

England.—Till the close of the 17th century the ware made in England was of a coarse, common description, and those who could afford the luxury obtained their pottery from the Dutch and other superior makers. The first step towards improvement was effected by John Dwight, M.A., who in 1671 obtained a patent for making stoneware, vulgarly called Cologne ware, and by him the Fulham manufacture of stoneware was first established. A still more marked influence was produced on English pottery about the same time by the brothers Elers, from Nuremberg, who settled at Barlston, and there produced a ware which they called red Staffordshire ware. To these potters we owe also the origin of the process of salt-glazing of stoneware. Finding their secrets were discovered by Astbury, they removed to Lambeth, where they established themselves in 1710. From this time onwards improvements were introduced in the Staffordshire potteries; but the great strides which for a time put English pottery in the foremost rank of the productions of the world were due to the great potter Josiah Wedgwood (1730-95, q.v.). In every department, in body or paste, in methods of ornamentation, and in the employment of artists of the highest ability, Wedgwood, with untiring application and with unstinted expenditure, aimed after perfection; and his efforts alone raised the manufacture of pottery in England to the position of an industry of national importance. Away from Staffordshire potteries of some importance existed at Lambeth, Bristol, Liverpool, Leeds, Lowestoft, and Swansea; but by degrees the manufacture drew more and more towards Staffordshire, where, in the towns collectively known as 'The Potteries,' embracing Stoke-on-Trent, Etruria, Hanley, Burslem, and some others, it now principally centres. Josiah Spode (1754-1827) made a famous kind of opaque porcelain or 'ironstone china.' English stoneware and pottery owe much to Sir Henry Doulton (q.v.), and his works at Lambeth, in the Potteries, and near Glasgow.

Peruvian.—In the New World the art of the potter showed an interesting development among the ancient Mexicans and Peruvians before the American continent became known to Europeans. No knowledge of glazes than those of the people, but, in the case of the Peruvians especially, a high degree of skill in working clay was developed; and they modelled and modified animal forms with great knowledge and spirit. Their most characteristic pottery was black, but they also made vessels of a fine, warm, yellowish body, formed on the potter's wheel, and having painted decorations analogous in style to those on archaic Greek vases.

Porcelain.—The substances with which we have dealt in this brief historical summary up to this point comprise only pottery, as contradistinguished from porcelain. The term porcelain is of Italian origin, derived from porcellana, the cowrie shell, owing to the similarity of the white glazed surface of the porcelain to that of the shell. Of porcelain there are two varieties, one being soft or artificial porcelain, the pâte tendre of the French, which may be looked on as a chemical compound, and which is wholly fusible at high temperature. The second variety, hard or kaolinic porcelain (the French pâte dure), is the true oriental porcelain, composed of two natural mineral substances alone, Kaolin (q.v.), an infusible white clay, and petuntse, a mixture of felspar and quartz, fusible in its nature, the presence of which gives its semi-fused translucency to the body of the vase.

China.—It is to the Chinese that the world owes the manufacture of porcelain; and in strict chronological sequence, in antiquity of the industry, in skill and resource in working raw materials, and in richness and variety of the finished products the Chinese porcelain ranks first place. When the Greeks were making their terra-cotta vases the Chinese were manufacturing porcelain; they had mastered the secrets of that most difficult of all ceramic tasks 2000 years before it was accomplished by Europeans. According to their own records, pottery was made in the Chinese empire in the reign of their mythical Emperor Hwang-ti about 2690 B.C. Without assuming the historical accuracy of such a precise date, there is no doubt that true porcelain was made in China under the Han dynasty between 206 B.C. and 220 A.D. From that time onward the art developed and improved, and, subject to fluctuations caused by revolutionary troubles, the porcelain manufacture continued to flourish in China till recent times. The most famous centre of the industry was formerly King-te-chin, the present Peking; but the production of Kiung-si, where it is known porcelain was made about 680 A.D. In this town alone there were early in the 18th century no fewer than 3000 porcelain furnaces; but the place was ruined by the Tai-jing insurrection. Chinese porcelain exhibits endless variety in form and painted decoration. The mythical dragon, the kylin or mythical lion, the spotted deer, domestic fowls and other birds are favourite subjects on Chinese ware. Of all Chinese porcelain that now most sought after is the old brown ware with its at first copied and imitated by the Delft manufacturers. Crackle ware, in which the glaze shows a series of separation towards the body, is a peculiarity of oriental manufacture. The Chinese appear to possess the secret of causing the cracks in the glaze to be large or minute at will. Ruby glazed ware (the Sang de boef of the French) and the bejewelled glazed porcelain are also highly treasured in Chinese porcelain. The soft sea-green glazed ware known as Celadon glaze

![Fig. 22.—Early Staffordshire Teacup or four-handled drinking cup.](image)

![Fig. 23.—Chinese Porcelain Vase.](image)
POTTERY

is assumed to be the earliest form of Chinese porcelain, and genuine ancient pieces are highly valued.

Japan.—A knowledge of Chinese porcelain passed into Japan as early as it is said, as 27 B.C.; and it is known that a corporation of porcelain-makers was established in that country in 720 A.D. In the 18th century a Japanese potter went to China to improve himself in the art of porcelain-making, and after his return he carried on the manufacture in his native country with great success. It is, however, more in the manufacture of pottery than of porcelain that the Japanese exhibit pre-eminent skill. The most famous porcelain manufacture consists of Satsuma ware, having been established in the neighbourhood of Kyōto by the formerly powerful princes of Satsuma. It is of a pale yellowish colour, covered with minute crackles in the glaze, and very richly painted and lavishly gilt. The so-called Satsuma now manufactured is yellower in colour than genuine old pieces, and it is principally made at Atawa near Kyōto. The Japanese potters generally display a remarkable power in moulding pottery and finishing its surface so as to imitate other substances, such as woods of various kinds, basket-work, &c. Among their most remarkable productions are examples of delicate moulding in Banko ware, which consists of small teapots and other vessels of a brownish and greyish unglazed earthenware, extremely light and thin in body, and very much appreciated among the native population for tea-making. The Japanese excel in the manufacture of egg-shell porcelain, so called on account of the extreme thinness of the body. Among their other porcelain manufactures Kaga ware is the most outstanding, being characterised by painted ornaments in a rich ruby colour, which is generally lawfully gilt. It is a favourite with the Japanese, and frequent flower in their vases, the crane and other birds figure most effectively, and figures of warriors and ladies are frequently employed in the resourceful and varied ornamentation of Japanese ware. The principal centres of the pottery industry in Japan are in the province of Owari, whence comes Seto ware; Kaga, for ware of that name; and Mino and Kyōto.

Persia.—Chinese porcelain was known in Persia as early as the 12th century, a circumstance not to be wondered at, seeing that Persia is then supposed to have been for centuries before the principal highway of commerce between the far East and Europe. Many evidences exist of the acquaintance of the Persians with the ceramic products of China; and at an early date pottery and a species of soft porcelain were made in Persia which both in form and decoration were modelled on Chinese originals. But Persia also had a manufacture of pottery and of enamelled tiles of an original and distinctive character, in which a fine white enamelled glaze brilliantly gilt, which lustres were employed in a most effective and original manner.

Porcelain in Europe.—In the 13th century the early European traveller, Marco Polo, visited the porcelain factories of China. In 1287 Lorenzo de' Medici received from the sultan of Egypt a present of porcelain. In 1312, according to the first record we possess of the appearance of the ware in Europe, the Portuguese were the first to import porcelain direct from the East; and subsequently large quantities were brought by the Dutch and by the East India Companies of other nations. No sooner did the ware become known in Europe than strenuous efforts were put forth in many quarters to imitate it. A certain amount of porcelain is alleged to have been made in Venice about 1470; but the earliest European porcelain of which any examples exist is that which was made by Francis de' Meskeli II., Grand-duke of Tuscany, about 1530. The quantity made appears to have been small, and the attempts at the manufacture ceased with the death of the grand-duke in 1587. Nearly a century later the art was revived at Rouen and at Paris, but it was not till 1693 that a permanent and well-established industry was founded in France at St Clou. Thereafter, porcelain manufacture was taken up in other French towns. At Vincennes it was begun in 1745; in 1753 Louis XV. became a partner in that concern. In 1756 the works were transferred to Sèvres, and in 1760 that establishment became entirely national property; and so it has continued amid all fluctuations in government and the present day. Hard porcelain was first made at Sèvres in 1764; but the fame of that establishment rests on its soft porcelain, in which body, glaze, and enamel colours blend together into a singularly smooth and lustrous whole.

But in Europe it was in Germany that the secret of making hard or kaolinic porcelain was first discovered. After years of labour and innumerable trials, which resulted only in the production of a kind of opaque glass or imitations of porcelain, Böttger (q.v.), an alchemist who had entered the service of Frederick Augustus II. of Saxony, succeeded in 1700 in making a white hard porcelain at Meissen, near Dresden. The china-clay and china-stone he employed had previously been searched for in vain by Schmor at Aue. Extraordinary precautions were taken to prevent the process of the manufacture from being revealed; but, notwithstanding the oaths imposed on the workmen and the other means employed for their supervision, the secret was betrayed by one Spindel, who fled to Vienna, and there the imperial factory which continues to this day was established in 1718. Subsequently factories under national protection were established at Höchst in 1740, at St Petersburg in 1744, at Berlin in 1750, and at Ludwigsburg in 1758. Works at which soft porcelain was principally made were established at Doccin near Florence in 1735, at Capo di Monte near Naples in 1736, and at Buen Retiro in Spain in 1759; and the products of all these manufactories have attained considerable reputation.

In Great Britain manufacturers have at all times devoted themselves principally to the making of a variety of soft porcelain. The works at Chelsea, Bow, and Derby were established about 1745, and in 1751 the manufacture began at Worcester, where it still continues. Hard porcelain-making was begun at Coalport in 1768, following by the celebrated china-clay at Coalport in 1768, after he had discovered china-clay in Cornwall. But his work continued only for about three years. Cookworthy's patent rights were then transferred to Richard Champion, who continued the manufacture at Bristol till 1781. In Staffordshire porcelain was first made at Longport, Hall near Newcastle in 1752, but it was not till about the close of the 18th century that Staffordshire porcelain became artistically and technically fine in the hands of Thomas Minton, who founded the famous works of Minton & Company, and of Josiah Spode, whose undertaking continues under the firm of Copeland & Company.
In the later part of the 18th century valuable porcelain was also made at Lowestoft, Coalport, Nantgarw, Swansea, and some other centres. The manufacture of Parian or stoneware porcelain, which is an unglazed modification of English soft porcelain, was introduced by Copeland and Minton about 1848.

It is a common practice to place on pottery and porcelain distinctive marks, either painted on or stamped into the bottom of the articles. These indicate either the manufactory in which the pieces were made, or the workman, and sometimes the decorator, employed on them; and in the case of Chinese and Japanese ware the marks give the dynasty or date of execution. It is only in the case of Sèvres porcelain that the habit of marking a date by letters of the alphabet was practised. In Chinese porcelain date-marks are found indicating that the piece was made as far back as the 10th century; but there is reason to believe that many of these early marks are forged, and at most are only copies of more ancient examples which have now ceased to exist. On some pieces of early majolica the date, place, and name of the artist are given. The great European manufactories have generally marks which indicate the place of making only; but there are often cases of arriving approximately at the date. The illustrations (fig. 25) show the marks employed at various important English works; but many of the manufacturers imprinted or impressed their names in full. In connection with these marks and names it should be borne in mind that it is easier to forge marks and names than it is to produce works equal to the originals.

imitated, the excellence and value of which causes such forgeries to be put in circulation. There is a vast quantity of forged porcelain in existence, and, specially, imitations of the fine old soft porcelain of Sèvres and of other famous fabrîques are very abundant.

The literature of pottery and porcelain is exceedingly voluminous. Among standard works of general interest may be mentioned Bonganni, Traité des Arts Cérámiques (3d ed. 1877); Marryat, History of Potter and Porcelain (2d ed. 1864); Jaquemart, Histoire de la Céramique (1873; Eng. trans. by Mrs Palliser, Lond. 1873); Garnier, Histoire de la Céramique (Tours, 1883); Davillier, Les Origines de la Porcelaine en Europe (1883); South Kensington Museum Art Handbooks: Birch, Ancient Pottery (new ed. 1879); Bayes and Collignon, Histoire de la Céramique Grecque (1888); Jewit, Ceramic Art of Great Britain (new ed. 1883); Solon, The Art of the Old English Potter (2d ed. 1885); Meteyard, Wedgwood and his Works (1875); Audley and Bowes, Ceramic Art of Japan (1881); Garnier, La Porcelaine Française de Sèvres (1880 et seq.; English trans. nearly simultaneously); Bowes, Japanese Pottery (1890); Darell and Delange, Revue de Peinture Italienne (1867). For marks and monograms: Chaifiers, Marks and Mono-

![Image of marks on English ware](image_url)

Fig. 23.—Marks on English Ware:


Pottstown, a borough of Pennsylvania, on the Schuylkill River, at the mouth of Manatawny Creek (both crossed by bridges), 40 miles by rail NW. of Philadelphia. It contains iron-foundries, blast-furnaces, rolling-mills, nail-factories, ear-work, &c. Pop. (1880) 5505; (1900) 13,696.

Pottsville, capital of Schuylkill county, Pennsylvania, is built on the side of steep hills, on the Schuylkill River, at the entrance of Norwegian Creek, 93 miles by rail NW. of Philadelphia. It is in the midst of a rich anthracite coal and iron region, and has several iron-foundries, foundries, rolling-mills, machine-shops, sawmills, &c. Pop. (1880) 12,233; (1900) 15,710.

Potwalloppers (from pot, and wallop, ‘to boil or bubble’), the popular designation of a class
of electors forming the constituency of various English boroughs (e.g. Taunton, Preston) before the Reform Act of 1832. Sir James Stephen's book "Votes as such as seek their own diet in a fireplace of their own." At Taunton in the 18th century several inmates or lodgers would, some little time before the election, bring out their pots, and make fires in the street, and dwell their victuals in the sight of their neighbours, that their votes be not called in question" (Defoe's "Tour through Great Britain", 4th ed. 1748).

**Pouched Mouse** (*Dipodomys*), a genus of small, lean, long-tailed, agile rodents, with cheek-pouches. The best-known species is *D. phillipsi*, from the waste regions of California, where it seems to frequent the Hudson River. It is a species of seeds and roots, and in the dry season no drink but dew.

**Pouched Rat** (*Pseudomys or Geomyys*), a genus of plump, short-tailed, hamster-like rodents, with cheek-pouches which open externally and are used as receptacles for food. One of the best-known species is *P. or *G. burraria*, sometimes called "Ground squirrel." It is a native of North America, and inhabits the territories east of the Rocky Mountains and west of the Mississippi. It is a burrower like the mole, active in the warm weather, hybernating in the cold, sluggish above ground, but very active in its subterranean procreation. It is a plump edifice—edifice, and is 3094 feet in length from anchorage to anchorage; or, including the approaching viaducts, nearly 7100 feet. Over three spans are cantilevers, with arms of 160 feet. The city is well built, with fine public and private edifices, but the spans have not 32 stories from the river. Poughkeepsie is the largest town between New York and Albany; its manufactures include machinery, iron-ware, silk, boots and shoes, clothing, &c., and it has a rolling-mill, a blast-furnace, and several breweries. Two miles to the north is the United States Hospital for the Insane, which cost $750,000, and the city contains a number of charitable institutions. But Poughkeepsie has most reason to be proud of its educational facilities. Vassar College (q.v.) is just beyond the eastern city limit, and the town possesses also a collegiate institute, a business college, and several high-class seminaries and academies, besides the public schools. Poughkeepsie was settled by the Dutch about 1680; in 1778 it was the state capital, and in 1788 the New York Convention met here to ratify the constitution of the United States. Pop. (1870) 89,680; (1900) 24,829.

**Poultice.** See OCTOPUS.

**Poultice**, an application to diseased or painful parts, for the purpose of promoting suppuration, relieving pain, and stimulating or soothing the skin, according to circumstances. A poultice may be composed of any moist, pulpy substance of sufficient consistence to retain the water without dripping, or soaking through the flannel or linen covering in which it is generally applied. The making of a poultice well is a matter of some nicety, and unless the proper consistence is given to the mass the application is apt to do more harm than good. The lined-meal poultice is the most easily made, and most satisfactory of all soothing applications. It is made by heating a sufficient quantity of boiling water, placed in the bottom of a small basin or teacup, until a perfectly smooth pulp is formed of the proper consistence, and in quantity sufficient to cover completely, to the thickness of three-quarters of an inch, the whole part of the body to which it is applied. It is then placed in a flannel, or poured into a flannel bag, and applied as soon as the heat will permit it to be borne. If it is to be applied to a wound, threatening abscesses, &c., where a softening effect on the superficial tissues is desired, some oil should be smeared over the surface, and the poultice put directly in contact with the skin. If applied for pain, or some deeper inflammation where heat is chiefly needed, the oil is unnecessary, and the poultice should be enveloped in cotton-wool or in several layers of flannel. It can then be borne hotter, and will retain its heat longer. The bread and milk, or even bread and water or bran poultice, is also very good; as is also the oatmeal-porridge poultice, to which a little butter may be added with advantage. A spoonful or two of yeast may be added, if there are foul discharges, or, or sprinkled on the surface of the poultice before it is applied, or it may be made with a non-irritating antiseptic lotion instead of plain water (e.g. corrosive sublimate, from 1 to 2000). Carrot poultices are in great favour with the people of the West, and the use of fennel poultices, made of the fresh leaves, or of the dried leaves, with the aid of some powder of the leaves, form a valuable sedative application in painful diseases; and poppy-heads, or even opium, are sometimes infused in the water of which a poultice is made, for the same purpose. A stimulating poultice may be made by sprinkling oil of turpentine, or chloroform, or mustard in moderate quantity on the surface of any ordinary poultice. When considerable irritation of the skin in a short time is desirable, a mustard poultice is used. For the danger of poultice, see EXCRESCE.
Europe, being, it is supposed, brought into Britain by the Romans, since whose time it has been an important article and we have not some forty distinct. The fighting qualities of game fowls have always been specially studied, and Cock-fighting (q.v.) was once a recognized sport in the United Kingdom, followed by all classes of society.

Poultry are valued for two purposes: (1) for their flesh, and (2) for their eggs. The value of the latter has been computed at £2,235,451; that of the former at £4,356,807, in the United Kingdom in 1890.

There are all kinds of British poultry; their caprices have been occasionally described by the most ancient writers, and upon some important occasions they were fed with great expense. The keeper of poultry is a very profitable occupation, and those who possess the knowledge necessary to carry it on are always in demand. The love of poultry is a passion that is growing more general every year, and the trade is becoming more important with every season. The demand for poultry is increasing, and the supply is not keeping pace with it. The cost of breeding and feeding poultry is a matter of great importance, and should be carefully attended to.

General Purpose Poultry. — Breeds which are not specially good in any one quality, but well balanced and good all round; chiefly of the Chinese type—i.e., heavy in leg and bone, large in size, and with high tails. Breeds made for this purpose are the Chinese (black) and Japanese (red), whose flesh is excellent in flavour, and easily digested. It enters very largely into the food-supply of the country in an ever-increasing ratio, and is strongly recommended to invalids or persons of weak digestion. Eggs (q.v.) are consumed to an even greater extent, and more generally than can ever be the case with poultry; for they are within the reach of all persons, and are used for every form of cooking, as also largely for manufacturing purposes. The great and ever-increasing demand in Britain for this class of food is seen in the vast imports, which have grown so enormously. In 1864 the value of eggs imported from the continent of Europe was £355,028; in 1870, £1,102,080; 1875, £2,539,800; 1880, £7,730,500; and 1885, £14,535,807, besides poultry to the value of about half a million. And in the same period it is estimated that the eggs and poultry received into Great Britain from Ireland, which has always been a large poultry and egg-producing country, amounted to one and three-quarter million pounds and more, so that Britain's poultry and egg consumption, if we take the value of home production as equal to that of Ireland, is nearly seven and a half million pounds annually. A calculation was made in 1864 to make an allowance for the quantities that the income derived from the sale of eggs and poultry in that country is £13,496,000—viz., £6,140,000 for poultry, and £7,356,000 for eggs. The number of fowls is computed at 45,000,000, representing a value of £4,500,000. It has been said that the daily consumption of eggs in the United States is 44,000,000, which would represent an annual value of more than £200,000,000.

Although the breeds of poultry are not so numerous as are those of pigeons, the development of breeds since the era of poultry-shows has been very rapid, and we have now a great many new breeds. There are several varieties, several of which are again subdivided by different colours. There are about twenty varieties of ducks, seven of geese, and six of Turkeys (q.v.) domesticated. Ducks are most prolific layers, and there is always a good demand for their eggs, especially by cooks and confectioners. The breeds of ducks valued for table purposes and for breeding are almost all good layers—the Aylesbury, Pekin, and Cayuga breeds being famous; the eggs of the Roman breed are rather smaller than those of Aylesbury. Few may be divided into four classes—viz., table breeds; laying or non-sitting breeds; general purpose breeds; and fancy or ornamental breeds.

Table Poultry. — Characterised by rapid growth, fine quality of flesh, and great breast development. Important British breeds are the Leghorns (blue), the Bantams (six varieties), the Bantams (thirteen varieties, but constantly being added to, many from China and Japan), the Long-tailed, Silkie, Sultans, Frizzled, Naked Neck, and Rumpless, &c.

That poultry can be made profitable is undoubted, but hitherto the great majority of British poultry-farms as such have ended in failure. Considerable profit is often made by those who breed and exhibit pure-bred poultry, whilst the advantage of having fresh eggs and home-fed poultry is sufficient inducement to any who wish to try them. Few, if any, fewfors, apart from the pleasure derived from them. Poultry can be kept under many conditions, and have been found to thrive in the most unlikely places, but all their wants must be artificially supplied. To maintain them in health they should have a house dry above and below, with 16 square feet of floor space for every half-dozen fowls of the medium-sized varieties, an outside shelter in which is placed a dust bath, this being the way in which their skin and feathers are cleansed, and an open run without. If they can be given full liberty it is all the better, but, if not, a good aviary should be placed out in fields or parks are the best; but often it is impossible to do this, and then not less than 6 square feet of ground should be allowed to each fowl if the run is laid in gravel or sand, or 100 square feet per bird if it is made up of grass and hay, the latter are not attainable in the ground by them, some substitute must

Laying or Non-sitting Poultry. — In these the laying powers have been greatly developed (some varieties producing upwards of 200 eggs per annum), and their value is almost the same, but the market is much stricter. They are chiefly of the Mediterranean family, but not exclusively so. These Mediterranean varieties have large single combs, a lightish body, and include Ancooms (speckled), Andalusian (blue), Leghorns or Italans (of which there are ten varieties), the They (black or white), and Black Hamburgs (with long white faces). — Under this term are two families, the Yorkshire and Lancashire Pheasant Fowls (spangled and black), as also the Redcaps, and the Dutch (pencilled), all very beautiful, and the most prolific layers we have. — Apolites.— Austrian French breed, with a crest, pale legs, and five toes. — Have a very large crest, are good layers, but are delicate; of these there are six colours. Scotch Greens.—A cuckoo-plumaged fowl, with pale legs, good flesh, and suitable for cold climates. — Fancy or Ornamental Poultry. — These include the breeds which are either bred alone for their beauty or peculiarity of plumage, or by reason of diminutive size are of no service for economic purposes. They embrace the Game Bantams (six varieties), Bantams (thirteen varieties, but constantly being added to, many from China and Japan), the Long-tailed, Silkie, Sultans, Frizzled, Naked Neck, and Rumpless, &c.
be provided. For laying birds it is found that soft food is very beneficial, and it should be given in the morning, with hard even in the later part of the day. Sheep, for example, are kept in the field for the first five months, and are then kept in the shed for the next two months, and after that four times a day until they reach maturity. Artificial incubation and brooding are very largely adopted by poultry-breeders, and have been brought to a remarkable state of perfection, the machines now sold working with great regularity and precision (see INCUBATION). The advantage of incubators is that they can be used at any period of the year, and are not dependent upon the weather, as is the case with hens. The Heron and Westernia incubators are the best, and the Westernia brooder has proved remarkably successful for all kinds of poultry. This plan of working is largely employed in France and America. Poultry are polygamous, and from four to ten hens should be placed with each cock bird, according to breed and the season of the year.

Poultry-farming.—Many attempts have been made to improve poultry-farms, but they have always ended in failure, and it has come to be regarded as an axiom that poultry will not pay. The reasons for this failure have been twofold: first, that the amount of space necessary to keep the fowls in health when in large numbers, and the consequent increase of labor, were too heavy a charge against the enterprise; and second, the placing of a large number of birds together, under conditions which were unhealthy, induced disease, and so ruined the scheme. The great mistake has been made in attempting poultry-farming as a separate industry, rather than as part of a larger enterprise. Where this can be grafted upon other work, an addition to the business of farming or fruit-growing, it can be, and has been, made successful in several notable instances. In these there is no separate charge for land; the labour is not on account of it alone; and the prices of the food being obtained by themselves from the ground, and such as is given is at the first cost; the produce can generally be sold with what other is going to market, and especially if dairying or fruit-growing be introduced into, these when purchase milk or butter or fruit being necessarily sold at a smaller profit, and chickens; and, finally, the land is enriched by the manure of the fowls, whilst its employment for other purposes will prevent its becoming foul, the great danger when only poultry are kept on the land, for disease is speedily induced by foul ground.

The force of events during recent years has compelled many British farmers to take up what were at one time regarded as minor pursuits, and branches of farming which in themselves are not sufficient to give a living—for which reason they were neglected for many years—have received attention. Once it has been expressed, ‘commercial poultry will only pay as an accessory to something else, whether it be a farm or a household—to eat scraps which would otherwise be wasted ... and to give to the land, in the shape of manure, poultry-yard manure, which can be obtained except by a heavy outlay.’ When we look to France, where poultry are bred to such an enormous extent, we find that poultry-farms as such have no existence, but that fowls are kept by every farmer and cottager. The same remarks apply to Italy. In Italy, the number from all of which countries England receives large supplies of eggs and poultry. In the wine districts of France fowls are permitted to wander amongst the vines all the year round, except just when the fruit is forming, and they do a most serviceable work in cleaning and manuring the ground. The French poultry-farmers grow vines, cultivate the land, and keep vines, and in many cases are made sufficiently narrow to pass between the rows of plants.

In France, in the Surrey and Sussex districts of England, and also at Aylesbury, where so many ducks are fattened every year, systems of fattening are extensively carried on, but as a rule, in France, especially, those who rear the birds do not fatten. Fattening is a business by itself, birds being purchased from the breeders when about eight weeks old. They are put into pens and fattened for a period varying from three to ten weeks, either by land or with machines. Some of the machines are very elaborate, but as a rule they are simple. The head of the fowl is held in the left hand, and a brass nozzle, attached to a piece of India-rubber tubing, and connected with a cylinder, is inserted into the mouth of the bird. In this cylinder is a supply of liquid food, made of buckwheat or some other meal, milk, and a little fat, and it is so arranged that when a pedal is pressed by the foot a portion of the food, varying according to the stage of fattening—for it is increased in quantity each day until the process is completed—is injected through the tube and nourishes the bird.

By this means the fattening is carefully and skilfully conducted, and there can be no doubt of the result, as every one who has tasted a well-fattened French fowl will be able to testify. In the La Bresse, Le Mans, and La Sarthe districts of France, the number of fowls fattened every year is enormous, and the best specimens realise very high prices. The flesh is beautifully tender and white, and much more abundant than would be possible on an unfattened fowl. In Surrey and Sussex the method adopted is somewhat different, in that the birds are either fed by land or with heavy crank cramping-machines, powerful enough to force semi-liquid food into the crop of the fowl. Here the process does not last more than three weeks. When the birds are killed they are immediately plucked and placed, before they become too cold, in the ice-boxes used for the transport of butter. This process has been found to give them the best appearance. In Ireland there is very little fattening carried on, and consequently the poultry from that country are poor and sell at about the lowest price on the English market.

When the fowls are kept in large numbers the best method of keeping them is to build them portable houses or portable dwellings, for these can be transferred about from place to place, giving the fowls fresh ground and distributing their manure, which is very valuable indeed, over the land. Under no circumstances should more than fifty be kept on one flock; and it will be found in practice that they will not wander far from their home, or mix with each other, even if the houses be placed in adjoining fields. The ordinary methods of management are applicable here. There can be no question that the increasing price of land, which has taken place within the last half of the 19th century, has done much to discourage poultry-keeping, and the opposite tendency ought to have a reactive effect (see PEASANT PROPRIETORS). Much might be done in the way of encouraging poultry-keeping by adopting the cottage system, which has been found of the highest value, both in the minimum of cost and the maximum of results. A very important factor in successful poultry-keeping is the selection of right breeds, and it is essential that the produce should be marketed as specifically as possible. An egg two days old is worth twice as much as the same egg three days old, and this difference is always to be borne in mind, but is too often forgotten.

In the great cities and densely populated districts there is a constant demand for fresh eggs, and at
high prices. To secure the best returns all eggs and poultry should be sent to market clean, well packed, and in the best possible condition. The supply of the commoner varieties of poultry produced is very large, and the prices obtained are consequently small, but there is no limit to the demand for high-class qualities at remunerative figures.

See L. Wright, The Illustrated Book of Poultry (new ed. 1888); Tegetmeier, Poultry Book (new ed. 1872), and Poultry for the Table and Market (1892); Poultry (Dean and Son); S. Besse, Profitable Poultry-keeping (1883); L. C. Bale, Poultry-keeping for Farmers and Cottage-keepers, by the present writer (1893); also the articles Duck, Goose, Guinea Fowl, Turkey, Egg, Food, Incubation, &c.

Pounce, powdered resin, or some gum-resin such as mastic, sandarach, or copal, and also the powder of cattle-fish bones, formerly used for sprinkling over freshly-written writing to prevent blotting; fine sand was often substituted for pounce.

Pound (Sax. pund, Ger. pfund, Lat. pondus, 'weight'), long the unit of weight in the western and central states of Europe, differing, however, in value in all of them. The symbol lb. for it is equally general, originally derived from the Latin word libra. The old English pound, which is said to have been the standard of weight from the time of William the Conqueror till that of Henry VII., was derived from the weight of 7080 grains of wheat, all taken from the middle of the ear, and well dried. For a double weight, between the present avoirdupois and troy pound, see AVOIRDUPOIS, WEIGHTS AND MEASURES. In the British Pharmacopoeia of 1864 the troy ounce was given up, and the pound avoirdupois and the ounce avoirdupois were adopted. See also livre, mark.

The pound weight of silver, a common money standard among the ancient Romans, was introduced by them into the countries they conquered, and thus the term 'pound' became a designation of a certain amount of coined money. Thus, nowadays, the English pound is considered as something (a coin or otherwise) equivalent to 20 shillings, but originally it denoted the pound of silver which was coined into 20 shillings. From Edward I.'s time the coins were more and more diminished in size, that monarch coined 25 shillings from his, which only weighed as much as half of bullion his various successors coined 30, 45, 48, 96, 144, 288, in the time of Elizabeth 60, and under George I. 66 shillings to the pound of silver, and this rate still continues, the term 'pound' being severed from its original meaning, and signifying 20 shillings of the present coinage. The sovereign of gold was first struck under Henry VII.; its value rose to as much as 30 shillings; under Charles II. it was fixed at 21 shillings, and the sovereign was superseded by the Guinea (q.v.) till 1817 (see Money, Mint). The pound weight, originally of the same value as the English one, sank in value after 1355 till in 1600 it was but one-twelfth of the value of the English pound, and was accordingly worth 1s. 8d.; it was divided into twenty shillings, each worth an English penny. The Treaty of Utrecht fixed the money thereupon used should be of the same standard and fineness throughout the United Kingdom.

Pound, in English law, means an enclosure, of which there was generally one in every parish or manor, in which stray cattle were put and detained until the damage done by them was paid for. Whenever a stranger's cattle trespass on another's lands the latter can seize them, and take them to the pound, or impound them, as it is called, damage feasant, and can keep them there till the expenses are repaid. There was a distinction between pound overt, or common pound, and pound covert, or close pound; in the former case the owner of the beasts could go and feed and water his cattle while impounded, and it was his duty to do so; but not in the latter case. Now it is compulsory for the impounder in all cases to supply the cattle with water and feed, and to keep the animal in the pounds, he incurs a penalty; and if impounded cattle are not sufficiently fed a stranger who feeds them may not only trespass on lands to do so, but can recover the costs from the owner of the beasts. Goods dismembered, if liable to the stolen damage, should be returned to the pound covert. At Madresfield, near Malvern, a public pound was repaired so recently as 1888; but practically they are quite obsolete, since the law now permits a person dismembering for rent to secure the distress on the premises (see Distress). In the United States estrays are generally liable to be sold for the benefit of the poor of the place where they are found, or for some other public use.

Poundal, a name sometimes used for the absolute foot pound second unit of force, which will produce in one pound a velocity of one foot per second, after acting for one second.

Pounds, John. See Ragged Schools.

Poussin. See Pushkin.

Poussin, Nicolas, a painter of great celebrity, was born at Les Andelys in Normandy in June 1594, went at the age of eighteen to Paris, and studied with Perdrix, Bourdon, and other artists; he died at Passy, near Paris, and is buried there. His uncle, M. de la Caze, was himself a notary, and others, but chiefly improved himself by drawing from casts, and drawings and prints after Raphael and Giulio Romano, in the collection of M. Courtous, who accorded him access to them. After a long and hard struggle he obtained the object of his desire—the means of visiting Rome. He was thirty years of age when he arrived there, and a considerable period elapsed after that before he obtained much employment. At length, however, he received several important commissions from the Cardinal Barberini, which he executed so successfully that he afterwards rapidly acquired fame and fortune. After an absence of sixteen years he returned to Paris with M. de Chanteloup, and was introduced by Cardinal Richelieu to Louis XIII., who appointed him his painter in ordinary, with apartments in the Louvre, and a liberal salary. But in 1643, annoyed by intrigues against him, he returned to Rome; and there, after producing a large quantity of admirable work, he died on 19th November 1665. His style is a combination of classical ideals and Renaissance tendencies; his colours have changed so as to interfere with the harmony of his pictures, whose noble designs may be admirably studied in the numerous engravings of them. The finest collection of his works is in the Louvre; but some of the best are in the National Gallery, at Dublin, and in English private collections. His nephew, Gaspar Dughet (1613-1675), assumed his uncle's name, and as Gaspar Poussin became famous as a landscapist, his renderings of the Roman Campagna being especially noted. He worked also in tempera and fresco. The National Gallery possesses his MS. drawing with a sacrifice to Abraham.

See works on Nicolas Poussin by St Germain, Boucheté (1858), and Peillon (24 ed. 1875), with an article by Lady Dilke (E. F. S. Pattison) in L'Art (1882).

Pont. See Bin. The name Horned Pont and Bullpont are given in America to the siluroid Amiurus, also called Catfish (q.v.).

Poverty Bay. See Gisborne.

Pownal, another name for the Gwyniad (q.v.). See Coregonus.
POWELL

POYNTER

POWELL, Haden, physicist and theologian, was born in London in 1796, was educated at Oriel College, Oxford, in 1821 became vicar of Plainstead, and in 1824 was made F.R.S. From 1827 till 1829 he wrote a great many scientific papers, and in 1829 he was appointed professor of Geometry at Oxford. He published a history of natural philosophy (1834), treatises on the calculus (1830), optics (1833), and the undulatory theory of light (1841); but he is best known by his contribution on the evidences of Christianity without Judaism (1857), Natural and Divine Truth (1857), and The Order of Nature (1860).

POWELL, John Wesley, an American geologist and anthropologist, was born at Mount Morris, New York, 34th March 1834, and served through the civil war, in which he lost his right arm and rose to the rank of major. He was afterwards professor of Geology in the Wesleyan and Normal universities; in 1868 he spent three months of hardship and peril in exploring the canyons of the Colorado; and in 1870 a survey of that river and its tributaries was placed by congress under his direction. While so engaged he devoted special attention to ethnological researches, and in 1879 he was made director of the new Bureau of Ethnology; in 1881 he was appointed also director of the United States Geological Survey. Major Powell in 1886 received the degree of Ph.D. from Heidelberg and that of LL.D. from Harvard, and in 1887 was president of the American Association for the Advancement of Science; in 1889, as vice-president, he delivered an address on 'Mythological Philosophy.' Besides the Exploration of the Colorado River in 1869-72 (1875), Lands of the Arid Region of the United States (1879), &c., his works include Contributions to North American Ethnology, and Outline of the Philosophy of the North American Indians (Reports of the Bur. of Ethn.).

POWELL, Mary. See Milton.

Power is a legal term, to some extent identical in meaning with such terms as liberty, faculty, &c. A public officer is empowered to do certain acts which are not permitted to private persons. An individual, not under disability, has power to bind himself and to dispose of his property; if he chooses to settle his property he may effect the purposes of the settlement by conferring powers on himself and others; he may, for example, reserve to himself a power of revocation; he may give power to a person who takes a life interest to charge the inheritance with provisions for daughters, &c. Powers of appointment are commonly used in English settlements to enable parents to appoint or dispose settled property among their children. Such powers must be exercised in good faith, and within the limits prescribed of the settler who confers them. A power of attorney is a deed whereby one person appoints another to do some act on his behalf or to represent him generally. A, for example, may make it his attorney, to manage his estate and receive the rents during A's absence abroad. Forms of such powers are given in Davidson, Prideaux, and other books of precedents; the difficult legal questions which arise in regard to powers over settled property are discussed in the treatises of Sugden and Farwell.

Power. For the Mechanical Powers, see Mechanics; and for various motive powers, see Agricultural Implements, Steam-Engines, Silk-Making, Despatch, Fuel; see also Horse-power, Transmission of Power. For the 'Great Powers' of the world, see Balance of Power.

POWERS, Hiram, American sculptor, was born a farmer's son at Woodstock, Vermont, July 29, 1805. While still a boy he went to Cincinnati, Ohio, where he became an apprentice to a clockmaker, and in 1824 he went to Oxford, where he formed the acquaintance of a German sculptor, who taught him to model in clay. Subsequently he was employed for seven years making wax figures and fitting them with machinery for the Cincinnati museum. In 1835 he went to Washington, where he executed the busts of several distinguished persons. Two years later he was enabled to proceed to Italy to study his art, and he resided in Florence till his death on 27th June 1873. There he produced his statue of 'Eve,' which excited the admiration of Thorwaldsen, and in 1843 the still more popular 'Greek Slave,' of which six copies in marble, with casts copies innumerable, were produced. Of his 'Fisher Boy' (1846) three copies were ordered. Among his other works the chief were 'Proserpine,' 'Il Penseroso,' 'California,' 'America,' and 'Vestas.' In 1857, while on his way to New Orleans, he went to the city of Calhoun for South Carolina, and Daniel Webster for Boston, as well as those of J. Q. Adams, Andrew Jackson, Marshall, Van Buren, and other distinguished Americans.

POWHILL. See Pochantos.

POWIS Castle. See Welshpool.


POYNTER, Sir Edward John, painter, was born in Paris, 29th March 1836, the son of Ambrose Poynter, architect, and great-grandson of Thomas Banks, sculptor, R.A. He was educated at Westminster, Brighton College, and Ipswich grammar-school. Very delicate health caused him to be sent to Madeira for the winter of 1832-33, and from this visit arose the earnest desire to become an artist. In the summer of 1833 he went to Rome, and here he made the acquaintance of Frederick Leighton, then a young man painting his picture of 'Cimabue,' who allowed Poynter to work in his studio, drawing from the models and drapery from which he was studying for his picture. In 1836 he went to Paris, and spent some months in London. He now made many designs for stained glass, and drawings on wood for Once a Week and other periodicals, and for Dalziel's projected Illustrated Bible. This led him to study Egyptian art; and in 1844 he began his large 'Israel in Egypt,' of which the whole is a reconstructed picture. His water-colours in 1851 were much admired, and he was elected to the Royal Water Colour Society in 1853. In 1858 he was made an A.R.A., in 1876 an R.A. In 1871 he was appointed Slade professor, and in 1876 Director for Art and Principal of the training-schools at South Kensington—appointments which in 1883 he resigned as interfering too seriously with his time for painting. Among the most important of his works are 'The Catafalque' (1885); 'The Prodigal Son' (1869); 'The Blue Girl' (1871); 'The Festival' and 'The Golden Age' (1875); 'Zenobia' (1876); 'A Visit to Assuan' (1880, now at South Kensington); 'The Ida of March' (1883); 'Outward Bound' (1886); 'A Corner of the Market Place' (1887); 'Under the Sea Wall' (1888); 'A Corner in the Villa' (1889); 'The Visit of the Queen of Sheba to Solomon' (1890); and 'Persians and Amazons' (1872), 'The Dreamer' (1875), Wantley and Rame (1876), 'Northcote' (1876), 'Nausicaa and her Maidens' (1879), all painted for the Earl of Warrickhilfe, and now at Wortley Hall. In the years 1869-70 he did the cartoons for a large mosaic of St George in the central lobby of the Houses of Parliament. In 1882-84 he painted designs for the decoration of the dome of St Paul's, and cartoons (full size) for one portion of the dome. Of portraits may be
PRAED

POZZO DI BORGO

mentioned those of Lord Ripon (1886), Sir Gerald Graham (1886), and the Earl of Harewood (1888). In 1894 he became director of the National Gallery. In 1896 he joined Biddulph Grammar School, and knighthood. See the article by Cosmo Monkhouse in the Art Journal for Easter 1897.

Pozzo di Borgo, CARLO ANDREA, COUNT, was born near Ajaccio in Corsica, 8th March 1764, and was educated at the university of Pisa. An advocate in Ajaccio, in 1790 he joined Paoli (q.v.), becoming thenceforth the enemy instead of the friend of Napoleon. In 1796 the allies had driven Napoleon across the Rhine, Pozzo di Borgo drew up the famous declaration, 'that the allies made war not on France, but on Napoleon.' It was he who urged the allies to make war on Bonaparte. He represented Ajaccio at Paris and the Congress of Vienna, at the Congress of Verona, and in London, but retired from public life in 1839, and settled in Paris, where he died, 15th February 1842. See Notice Biographique by Valler (Paris 1842).

Pozzoluillo, a city of Southern Italy, on the Bay of Naples, 7 miles W. of Naples, with which it is connected by a tranversal city particularly interesting from its numerous memorials of classic ages. Its cathedral was the Temple of Augustus. The Temple of Serapis or Serapeum had a rectangular colonnade of twenty-four pillars, surrounding a round temple with sixteen pillars. Some have alleged that the outer enclosure surrounded a market-place. Some of the pillars still standing are much eaten into by the lithodoma mollusc (see Boring Animals), showing that this volcanic coast was for a considerable time submerged to a depth of 10 fathoms. The site was entirely upheaved again. Part of the ruins are still under the sea-level. There are the remains of an amphitheatre in which Nero fought as a gladiator, and which could seat 50,000 spectators; in it wild beasts refused to injure St. Januarus and his companions, thrown to them by persecutors. There are also remains of temples to Diana and Neptune, and of the ancient harbour of Puteoli. Behind the town is the Solfatara (anciently called Forum Vulcain, as being the entrance to Vulcan's forge), a half-extinct volcano, from which issue currents of hot sulphurous gases, injured by sufferers with chest complaints, and springs of saline water, used as a remedy for cutaneous diseases. In the neighbourhood are Avernns (q.v.); the royal (Italian) hunting-lodge Astoni; Lake Lucernina, celebrated for its oysters; the ruins of Baie (q.v.) and Cumae (q.v.); and the Lake of Aghano, with the Grotta del Cane (q.v.). Of a very different interest are the military engineering works, the Stabilimento Armstrong, a little to the west of Pozzoluillo; this is a branch of the famous company of Sir Robert Campbell Elswick, near Newcastle, established here (1888-90) with the support of the Italian government. Pop. 11,967. The ancient Puteoli was made a Roman colony in 194 B.C. Towards the end of the republican period it became virtually the port of Rome, and during the empire was the first emporium of commerce in Italy.

Puteoli was destroyed by Alaric, Genseric, and Totila, and, though rebuilt by the Byzantine Greeks, it was sacked by the Saracens (10th century) and the Turks (1550), and was only finally recovered by the French (1806 and 1838). St Paul landed there.—For the volcanic earth found here and elsewhere, and called Puzzolana or Puzzulana, see CEMENTS.

Practice, in Arithmetic, is the name given to a method, or rather a system of expedients, for shortening or avoiding the operation of compound multiplication. The nature of the expedients will be best understood by a few examples. Suppose the price of 64,875 articles at £2 17s. 6d. is required. It is obvious that the price, at £1, would be £64,875; therefore, at £2, it is £129,750; at 10s. it is the half of that at £1, viz. £32,437.10s. at 5s., the half of this last sum, or £16,218 15s.; and at 2s. 6d., the half of this, or £8109 7s. 6d. The sum of these partial prices gives the whole price.

Praed, WINTHROP MACKWORTH (1802-39), was born 28th July 1802, at 33 John Street, Bedford Row, London. His name Winthrop came from American connections; Mackworth had been the surname of his father, who was a sergeant-at-law. After some time at a public school, he passed to Trinity College, Cambridge, distinguishing himself in mathematics and natural science, and cultivating the lighter letters with increased success in Charles Knight's Quarterly Magazine, where he had for co-editors De Quincey, Macaulay, Moultrie, H. N. Coleridge, and others. In 1825, having won many college honours, he became tutor, and soon if not then, of Aylsham, intending to qualify for the bar, to which four years later he was called. In November 1830 he entered parliament for St Germans. He subsequently became member for Great Yarmouth, and later for Aylesbury, which he represented at his death on 15th July 1839. From 1834 to 1835 he was secretary to the Board of Control.

But for his short life Praed might possibly have been successful as an orator and politician. As it is, he derives his existing reputation from the finished and delightful works which he composed from his childhood. He is the Corypheus of the little band of rhymers whom criticism, according to its taste and fancy, either dignifies or stigmatises as writers of vers de société—a term in its stricter sense applied to those pieces which treat only of the sayings and doings of the fashionable world. The majority of Praed's efforts belong exclusively to this class; and in this line his note is so individual, his rhythm so brilliant, and his wit so bright, that it has hitherto been found more easy to imitate than to excel him. A typical example of this side of his talent is the poem called A Letter of Advice. But he is also admirable in a kind of metrical genre-painting—e.g. The Vicar, which, in the opinion of many, reaches a higher poetical elevation; while in The Red Fisherman, Sir Nicholas, and one or two other pieces, he not unskilfully emulates the manner of Macaulay and Iddo. His characteristics as a verse-writer are point, elegance, and vivacity; it is his defect that these excellent gifts are but seldom relieved by any graver note. His collected verses, popular in America long before they appeared in England, appeared in 1864 in two volumes, with a memoir by the Rev. Derwent Coleridge; in 1887 followed his prose essays; and in 1888 his nephew, Sir George Young, edited his political poems. The best modern study of Praed is to be found in Salimbard's Essays in English Literature (1890).
Prefect, a common name applicable to various Roman functionaries. The most important was the Prefectus urbi, or warden of the city, whose office existed at an early period of Roman history, but was revived under Augustus, with new and extended authority, including the whole powers necessary for the maintenance of peace and order in the city, and an extensive jurisdiction civil and criminal. The Prefectus praetorio was the commander of the troops that guarded the emperor's person.

Prebendaries. See BEDEAS.

Prebendaries. See VERNATION.

Praemunire, the name given, in English law, to a species of offence of the nature of a contempt against the sovereign and his government, and punishable with forfeiture and imprisonment. The name is derived from the first words (premuniire or premoniere facia) of a writ originally introduced for the purpose of repelling papal encroachments on the power of the crown. The action was in the nature of a private suit, by bestowing bishcipses, abbeys, &c. on favourites, often aliens, and the pope's insisting on deciding in his curia cases that ought to have been tried in the king's courts, were especially unpopular in England, and were the immediate causes of various statutes of praemunire. Severe penalties were imposed on those who gave or sought to enforce obedience to the papal encroachments. The Statute of Provisions (1350; see ENGLAND, CHURCH OF, Vol. IV., p. 357) was an early act of this sort; the first act called Praemunire was passed in 1353, but the name of Praemunire is specially used of an act of 1393, in which Richard II. re-enacted and strengthened the statute of Edward III. Under Elizabeth it was made a breach of the Statute of Praemunire to refuse the oath of supremacy. By later statutes of Praemunire, the words in the above description were rendered liable to the penalties of a praemunire, as (by 6 Anne, chap. 7) the asserting that any person, other than according to the Acts of Settlement and Union, has any right to the throne of these kingdoms. The knowing knowledge as well as the omission of any one present at any marriage forbidden by the Royal Marriage Act is declared by 12 Geo. III. chap. 11 to infer a praemunire.

Prænestæ. See PALESTINA.

Prætor was, among the ancient Romans, the title given to the consuls as leaders of the armies of the state; but it was specially employed to designate a magistrate whose powers were scarcely inferior to those of a consul. The praetor, in this specific sense of the term, was first instituted in 366 B.C., as a compensation to the patricians for being obliged to share with the plebeians the honours of consulship. It was virtually a third consulship; the praetor was entitled collegia consularia; he was elected by the same aspersors and at the same comitia. For nearly thirty years patricians alone were eligible for the office; but in 337 B.C. the plebeians made good their right to it also. The praetor's functions were chiefly judicial. Though he sometimes commanded armies, and, in the time of the consulship, had military authority within the city, yet his principal business was the administration of justice both in civil and criminal; and to the edicts of successive praetors the Roman law owes much of its growth. Originally there was only one praetor; but as the city and state increased, and their relations with other nations became more complicated, others were added. In 246 B.C. a second praetor was appointed, to settle disputes that might arise between Romans and foreigners temporarily resident at Rome, for trading or other purposes, hence called praetor perientes ("praetor of the city") and sometimes called praetor urbs ("city praetor"). In 227 two new praetors were appointed, to administer affairs in Sicily and Sardinia; and in 197, two more for the Spanish provinces, or six in all. Sulla increased the number to eight, and Julius Caesar to sixteen. Praetors reduced the number to twelve; but at a later period we read of eighteen, if not more. The city praetorship was reckoned the highest; and after a person had filled this office he sometimes received the administration of a province with the title of propraetor or proconsul.

Praetorian Guard (Lat. Praetorii Cohortes and Praetorian), a body of soldiers organised for the purpose of protecting the person and maintaining the power of the emperors. We read of a praetoria cohors, or select guard of the most valiant soldiers, attached to the person of Scipio Africanus, but it is to Augustus that the institution of them as a separate force was owing. He formed nine or ten cohorts of three thousand men each (horse and foot), but kept only three of them in Rome, the rest being dispersed in cities not far off. Tiberius, however, assembled the nine cohorts at the capital in a permanent camp, and Vitellius increased their number to sixteen. The Praetorians served at first for twelve, and afterwards for five or ten years; they received double pay; the privates were held equal in rank to the centurions in the regular army, and on their retirement each received 20,000 sesterces. They soon acquired a dangerous power, which they exercised in the most unscrupulous manner, deposing and elevating emperors at their pleasure. Aspirants for the imperial dignity found it advisable, and even necessary, to bribe them largely; while those who acquired that dignity without their assistance were accustomed on their accession to purchase their favour by liberal donations. The Praetorians, however, had no political or ambitious views; they were simply an insolent and rapacious soldiery, fond of substantial gratifications, and careless how they got them. After the death of Pertinax (193 A.D.) they actually sold the "purple" for a sum of money to Julianus, who, in the same year, a new and peculiar organisation was entirely broken up by Severus, who formed new cohorts altogether out of the best legions serving on the frontiers, which he increased to four times the number of the old. After several other changes Constantine (312) dispersed them among his regular legions.

Pragmatic Sanction (sometimes Pragmatic Rescript), a solemn ordinance or decree of the head of a kingdom relating either to church or state affairs. The term originated in the Byzantine empire, and signified a public and solemn decree by a prince (pragmaticos, 'business-like,' later 'versed in affairs, 'officer'), as distinguished from the simple rescript, which was a declaration of law in answer to a question propounded by an individual. This name is given to several important treaties, of which the principal are (1) that of St Louis in 1209 and (2) that of Charles VI. in 1439, in which the 
Church (n.v.) were asserted; (3) the instrument which settled the empire of Germany in the House of Austria (1439); (4) the ordinance by which Charles VI., emperor of Germany, having no male issue, settled his dominions on his daughter, the Archduchess Maria Theresa of Austria (1745). The 
first instrument was the accession of the succession of the kingdom of Naples, which was ceded by Charles III. of Spain, in 1700, to his third son and his descendants.
PRAIRIE DOG (Cynomys ludovicianus) is a small rodent closely allied to the European Marmot (q.v.); these animals have received their vernacular name on account of the barking sound which they utter. They live associated together in colonies consisting of numerous burrows excavated by the animals themselves; their range is entirely restricted to the parks and plains of the Rocky Mountain plateau region in North America, and there appear to be two distinct varieties. They have been popularly supposed to share their habitats and to live in friendly relations, with rattle snakes and owls. As regards the rattlesnake, it is more than probable that its occurrence in the burrows of the rodent is to be explained by a desire to make a meal of its neighbours, while the owl may have a similar purpose in view; it is also possible in both cases that the burrows may be
merely utilised as a temporary hiding-place. The Prairie Marmot is rather larger than a large rat, and is of a brownish-grey colour, the under surface greyish white.

**Prairie Hen.** See GREASE.

**Prákrit** is the collective name of those lan-
guages or dialects which are immediately derived
from, or stand in an immediate relation to, Sans-
krit (q.v.). See also INDIA, Vol. VI, p. 102.

**Prase,** a rareish green variety of Quartz (q.v.).

**Pratique** is, strictly, a limited quarantine. A
ship having been put in quarantine when the
Captain has convinced the authorities of a port
that his ship is free from contagious diseases; and he is the
ereupon permitted to open trade and communication
with the shore.

**Prato** (often called Prato in Toscana), a
walled town of Italy, by rail 16½ miles S.E. of
Pistoia and 11 NW. of Florence. It has a citadel
and a cathedral with frescoes by Filippo Lippi,
though the see has been unified with that of Pistoia
since 1653. There are manufactures of straw-plait,
cloth, and paper and brass works. Pop. 13,510.

**Prawn,** a name applied indiscriminately to
crustaceans belonging to the genera Palæmon,
Palaemonetes. They are nearly allied to shrimps and
lobsters, are mostly but not ex-
cursively marine, and vary in size from a couple of
inches to over a foot in some tropical forms. There
are many species; thus, Palæmon quinquedens is
common in the Firth of Forth, while others abound elsewhere.

Many of them are semi-transparent, and exhibit
very fine colours; they are also very active
creatures, and most interesting inmates of an
aquarium, but are excessively voracious, and apt
to make great havoc among the inhabitants.

They are common on the British coasts, although
not so abundant as shrimps, and are generally
taken in the vicinity of rocks at a little distance
from the shore. They may be caught in putting
nets or in osier baskets, like those used for trap-
ing lobsters. They are esteemed for eating even
more highly than the shrimp. For illustration, see
CRUSTACEA.

**Praxinoscope.** See ZOETROPE.

**Praxítëles,** one of the greatest sculptors of
ancient Greece, of whose life little is known,
except that he was a citizen of Athens, and lived in
the 4th century B.C. His principal works—
neither all of which have perished—are the statues of
Aphrodite (at Corfu, Cnidos, Thespiae, and elsewhere)
of which that of Cnidos was the most famous,
Eros (at Spione), Dionysus (at Elles, Athens,
Megara, and other places), Apollo (the best
representing Apollo as the Python-slayer), and
Hermes carrying Dionysus (found at Olympia in
1877). Feminine beauty and Bacchic pleasures
were his favourite subjects; and in his treatment
of these he displayed unrivalled sweetness, grace,
and naturalness. His gods and goddesses were not
very divine, but they were ideal figures of the
fairest earthly lovelinesses.

**Prayer** is a universally acknowledged part of
the worship due to God; not merely petition,
but according to the New Testament models
and Christian usage, praise, adoration, confession
of sin, and thankful acknowledgment of mercies.
It is an innate and natural expression of dependence,
which seems almost necessarily to flow from a belief in the existence
of a god. Accordingly we find it both where
the object of worship is one Supreme Being and in
systems of polytheism. According to the Christian
system, however, prayer is not the mere sponta-
nous or voluntary approach of man to God in the endeavour
to appease his wrath, to win his favour, or to
obtain from him any blessing; but the right to
approach him in prayer, and the warrant to expect
advantage in doing so, rest on the revelation of his
own will. No is any truth more indisputably
taught in the Bible, or more frequently brought
into view in the Old Testament, than the absolute doctrine of predestination to the
most modified scheme which recognises the Creator
as supreme in the universe? Such questions bring up
the same difficulty which attends all other questions
of the relations between the human will and the
free agent, the freedom of man and the sovereignty
of God. But whatever seeming inconsistencies may
be implied in speculation concerning them, the
necessity of prayer and the power of prayer
are acknowledged equally by men of the most opposite
views; and generally with an acknowledgment of the
insufficiency of the human heart to foresee and
solve some of the problems which are thus presented to it. The extreme predestinarian
includes prayer among the means decreed of God along with the end to which
it contributes. And whilst prayer is regarded by
all Christians as of great value in its reflex influence
on the heart and spirit of the worshiper, the power
over stated as its whole value. It is held by
Christians in general that the only true
way of access to God is through the mediation
of Jesus Christ; and that prayer can be truly
made, in faith and for things agreeable to God's
will, only by the help of the Holy Spirit. The
Protestant churches all hold that prayer is to be
made to God alone; but in the Roman Catholic
Church, and to some extent in the oriental churches,
prayer of a kind is made also to saints, the Virgin
Mary, and angels. But as the worship (devo-
ration) of the saints differs from that (latrie)
offered to God, so the invocation of saints and angels is not for
the purpose of obtaining mercy or grace from
them directly, but in order to seek their prayers or intercession with God on our behalf. For this reason Catholics rely not only on the authority of Scripture, but on the unwritten word of God conveyed by tradition from very early times. The inscriptions in the catacombs prove that the
church of the first centuries invoked the saints; and the famous fathers of the 4th century expressly insist on such invocation. Protestants hold that prayer ought to be conducted in a language known to the
worshipers. The Church of Rome has, on the
contrary, maintained the general use of the Latin
language, even though that language is unknown
to the vast majority of the worshipers.

Forms of prayer for public use grew up in the earliest
times, naturally and inevitably: the Lord's
Prayer being doubtless regarded as a warrant
and model. Apparently the most primitive collection
is that in the eighth book of the pseudo-Clementine
Apostolic Constitutions (c.r.). The prayers in con-
nexion with the celebration of the eucharist in
the Greek and Roman communions are dealt with at
LITURGY. The most important post-Reformation
collection of prayers, that of the Anglican Church,
is dealt with in the next article. But most of the
leading reformers prepared prayer-books, Luther's
date from 1522, Zwingli's (Luther's, Strasburg) and
1541 (from Geneva), John Knox's
for the Church of Scotland (based on that of
Geneva) from 1554. The growth of Puritan feeling
in Britain led the Nonconformists, Presbyterians,
and others to undermine the advantages of set forms
of prayer, and to exalt the value of what is assumed
to be the spontaneous utterance of the heart. And ultimately it became usual to regard liturgical forms as essentially Episcopalian and non-Presbyterian, though the forms of church government are irrelevant to the question as to the best mode of guiding congregations in prayer. Since 1857 a section of the Church of Scotland has made tentative efforts towards securing the use of printed forms of public prayer, without wholly excluding extemporaneous prayer (see Lee, Robert). In 1888 the Assembly sanctioned the use of forms for the use of soldiers, sailors, and others; and the Euchologion, by the Church Service Society, has passed through several editions. In the United States liturgical forms of prayer have been almost wholly disused by all the churches save the Episcopal, Lutheran, German and Dutch Reformed, and Moravian churches. But since the middle of the 19th century there has been a manifest tendency to aim at increased dignity in Presbyterian prayer, and to bridge over the gulf that used to separate Presbyterians from the ancient church in the forms of public prayer in the sacred book of God. Professor Shields of Princeton's Presbyterian Book of Common Prayer is simply the Anglican prayer-book with the alterations proposed by the Presbyterians at the Savoy Conference (q.v.).

PRAYER FOR THE DEAD, in the Roman Catholic, Greek, and other churches, is offered with the intention and expectation of obtaining for the souls of the deceased an alleviation of their supposed sufferings after death on account of venial sins, or of the penalty of mortal sins, remitted but not wholly erased, by the practice of praying for the dead. This practice of praying for the dead is usually associated with the doctrine of Purgatory (q.v.), or with the belief in a progressive intermediate state (see HELL). It being once supposed that relations subsist between the two worlds, that their members may mutually assist each other, it is a necessary consequence of the doctrine of purgatory that the living ought to pray for the relief of their suffering brethren beyond the grave. It seems certain that some such doctrine existed in most of the ancient religions. Its existence among them, in the parable of Lazarus and the rich man in 2 Maccabees, chap. xii., that 'it is a holy and wholesome thought to pray for the dead, that they may be loosed from their sins,' Catholics contend that the doctrine as well as the practice is equally recognisable in the early Christian church. They rely on the parable of Lazarus and the rich man (Luke, xvi. 19-31), as establishing the intercommunication of this earth with the world beyond the grave; and on Matt. xii. 32, as proving the remissibility of sin or of punishment after death; as well as on 1 Cor. xv. 28, as attesting the actual practice among the first Christians of performing or undertaking certain ministrations in behalf of the dead. The Fathers of the 2d, 3d, and still more of the 4th and following centuries frequently allude to such prayers, as Clement of Alexandria, Tertullian, Hippolytus, St John Chrysostom, Cyril of Jerusalem, and St Augustine. The liturgies, too, of all the rites without exception contain prayers for the dead; and the sepulchral inscriptions from the catacombs, which reach in their range from the 1st to the 5th century, contain frequent allusions to them. In the services of the medieval and later church prayers for the dead form a prominent and striking element (see Requiem). The Protestant churches without exception repudiated the practice. In the history of English church prayer, W. 1st, his Church Book, and the Book of Common Prayer some prayers for the deceased were retained; but they were expunged from the Second Book; and no trace is to be found in that sanctioned under Elizabeth. Still it is not expressly prohibited, and it is cherished as a private and pious aspiration by not a few within the modern Church of England, as, in Coleridge's phrase, 'something between prayer and wish—an act of natural piety subdued by the instincts into the form of prayer.' On the doctrine of prayer, see Bickersteth, Treatise on Prayer (1856); Canon Liddon, Some Elements of Religion (1872); Newman Hall, Prayer: its Reasonableness and Effectiveness (1875); Jellett, The Efficacy of Prayer (Donnellan Lecture, 1877); the treatises on apologetics, and manuals of Theology. On prayer for the dead, see Plumptre, The Spirits in Prison (1884); Luckock, After Death (1879), and The Intermediate State (1890). For modern scientific objections, see Bishop of Rochester, Christian Social Laws (1874); Tyndall's British Association lecture (1874); and a series of articles in connection with Tyndall's 'Prayer Test' in Contemp. Rev., vol. xx.-xxi., by Tyndall, Galton, and others, with answers by M'Cosh, the Duke of Argyll, and others. For other questions connected with prayer, see the articles Ave, Paternoster, Kneeling, Rosary, Saints, Faith-Healing.

PRAYER, Book of Common. By this name are known the service-book of the Church of England and the several prayer-books of other Episcopal churches which have either been derived from the Church of England or largely influenced by it, such as the Episcopal Church of the United States of America, the Church of Ireland, and the Provincial Church in Scotland. The full title of the English Prayer Book (viz. The Book of Common Prayer, and Administration of the Sacraments, and other Rites and Ceremonies of the Church, according to the use of the Church of England: together with the Psalter, or Psalms of David, and the Book of Common Prayer [viz. The Book of Common Prayer, and Administration of the Sacraments, and other Rites and Ceremonies of the Church, according to the use of the Church of England];) declares the varied character of its contents, and indicates that the volume includes many services besides those (viz. Morning and Evening Prayer) to which the term 'Common Prayer' is strictly applied in the technical language of liturgiologists. Thus it will be seen that this comprehensive service-book embraces elements corresponding to parts not only of the Breviary (q.v.), but also of the Missal (q.v.), the Pontifical (q.v.), and the Sarum Missal. The Book of Common Prayer was (1) to rid the services of features which were regarded as the outcome of superstitition and ignorance (e.g. the invocation of saints, unhistorical and absurd legends read among the 'lessons'; &c.); (2) to introduce a more continuous and more extensive reading of Holy Scripture in the public services; and (3) to present all the services of the church in a language 'understanded of the people.' The publication in 1890 (from a MS. in the British Museum) of the draft, revised by Cranmer, of a reformed Book of Common Prayer to which the term 'Common Prayer' did not apply, was 1. a revision of the Book of Common Prayer which the minds of most of the influential English reformers had been influenced by the corresponding labours of Cardinal Quignon (see Breviary). The first and second of the objects above referred to were attained at in this project; the third work of the reformers was probably never attempted because the bolder design of giving the people all the services of the church in their native tongue had begun to be contemplated. Parts of the preface of Quignon's breviary were transferred, with some modifications, to the preface of the First Prayer-book, and still appear in the prefatory remarks entitled, in the present prayer-book, 'Concerning the Service of the Church.' The first vernacular service put forth by authority for public use was the Litany (1544), differing
of priests and deacons were reduced to the surplice, and those of the bishop to a rochet, for all ministrations. Among changes thus made, though of little or no doctrinal significance, may be mentioned the addition of the sentences, introductory address, general confession, and absolution to morning and evening prayer, and of the decalogue and responses to the closing form of the service.

On the accession of Queen Elizabeth the personal ecclesiastical sentiments of that masterful monarch made themselves sensibly felt. In the newly-revised prayer-book of 1559 (Elizabeth’s Prayer-book) very few changes were made, but they pointed in one direction. The vestments of the clergy were prescribed exactly as in the prayer-book of 1549 were again enjoined; in the litany the words ‘From the tyranny of the bishop of Rome and all his detestable enormities, good Lord, deliver us’ were omitted; in the communion service the words of Edward’s two books at the delivery of the elements were combined in the form still in use; the declaration concerning kneeling (the so-called ‘Black Rubric’) appended to the communion service of Edward VI.’s Second Prayer-book was omitted.

During Elizabeth’s reign the Puritan and Calvinist party within the church increased in strength, and the hopes of its members were raised high on the accession of James I., educated as he had been in Scotland under Presbyterian influence. Not many days after the king’s accession he was presented by the Puritans with a petition, called, from the great number of signatures attached to it, the Millenary Petition. This craved for the removal of ‘offences’ from the prayer-book. The petitioners further suggested a conference, and to this suggestion the king acceded, the outcome being the Hampton Court Conference (January 14, 16, and 18, 1604), so called from its place of meeting. The issue of this conference was deeply disappointing to the Puritan party. The alterations made were comparatively few and unimportant: certain chapters of the Apocrypha (Tobit, v. vii, and viii, and Dan. xiv) were removed from the lectionary; the words ‘or remission of sins’ were added as explanatory of the word, ‘absolution’ at morning prayer; a prayer for the queen and royal family, together with some special thanksgivings, as ‘for rain’, ‘for fair weather’, &c., were inserted. The only changes of much importance were the suppression of the catechism of the part treating of the sacraments (attributed to the pen of Overall, Dean of St Paul’s, and certainly not favourable to the views of the Puritans); and (2) the insistence on baptism being administered by the ‘lawful minister,’ as the church’s order; while the validity of baptism administered by any person using water and the prescribed form of words is still implied in the text of the service. It is worth observing that, while to the three earlier revisions and the last revision (1662) were given parliamentary authority (1552 and 1559, 16 Edw. VI., c. 1; 1 Eliz. chap. 2; 14 Carol. II. chap. 4), James considered that the authority of the crown was sufficient to introduce changes, which he was careful to style ‘explanations,’ as though they were not additions. The Hampton Court Conference’s ‘Prayer-book of the Church of Scotland’ (1637), commonly known as ‘Land’s Prayer-book,’ was a revision of the English prayer-book, in the construction of which Welderburn, Bishop of Dunblane, and Maxwell, Bishop of Ross, were chiefly concerned, their English advisers being Land and other Anglicans. It is remarkable for its reverting in the communion service to some of the characteristic features of the First Prayer-book of Edward VI.—e.g. (1) the ‘ Invocation,’ and (2) the commemoration of the faithful departed. It is also interesting to notice that the Scottish revision anticipated and happily met
some of the difficulties that have since been raised in respect to the Athanasian Creed. The prose
patter of this prayer-book was taken from the
authorised version of the Bible. The word 'presby-
ter' was used instead of 'priest.' The calendar
records the names of certain Scottish saints—e.g.
Columba, Ninian, Serf, Queen Margaret, etc.

The attempt to force this prayer-book upon the
Scottish Church proved a failure. The Episcopal
clergy, as it was, by the riot at St Giles' Cathedral, Edin-
burgh, on the occasion of its first being read (23d
July 1637), and the national uprising that followed
are parts of civil history. It should be added that
the Scottish prayer-book, which had seemed to be
stranged at its birth, was twenty-four years after-
wards among the most potent influences affecting
the revision which has brought the English prayer-
book to its present shape.

During the years of the Great Rebellion it was
enacted by an ordinance of parliament (January
3, 1645) that the 'Westminster Directory for the
Public Worship of God' should take the place of
the prayer-book; and a subsequent ordinance of
the same year (August 23) made the use of the
prayer-book in public 'or in any private place or
family' punishable with the loss of part of the
offence, £10 for the second, and a year's impris-
onment for the third. This harsh measure went a
long way to provoke the reaction of the Act of
Uniformity (1662).

On the restoration of the monarchy, in the vain
hope of conciliating the remaining party of Royalists,
a royal commission was issued (March 25, 1661) to
twelve bishops and twelve Presbyterian divines
(with nine coadjutors on each side) to fill the places
of members of the commission who might be absent
'to advise upon and review the Book of Common
Prayer, the Psalter, and other ancient liturgies which
have been used in the church in the primitive and present times... and, if occasion be,
to make such reasonable and necessary altera-
tions, corrections, and amendments as shall be
agreed upon for the giving satisfaction to tender
consciences.'

The meetings of the commission were held in the
Savoy Palace in the Strand, London, and hence the
name the 'Savoy Conference,' by which they are
commonly designated. Among the best known of
the members were bishops, archbishops, and divines
Cosin, Sanderson, and Brian Walton, with Drs
Pearson, Gunning, and Heylin. Among the Presby-
terians the most eminent were Baxter, Calamy,
Bates, Manton, and Reynolds. One of the most
notable episodes in the history of the conference
was the presentation by Baxter of a liturgy, com-
posed by himself in the space of a few days, which
the Presbyterian commissioners desired should be
authorised and placed on a footing of equality with
the Book of Common Prayer. The conference, as
was to be expected from the temper of the times,
caused in the discomfiture of the Parliam party
very few of whose suggestions were adopted.

Subsequently royal letters were addressed to Con-
voction directing the revision of the Book of
Common Prayer. This revision brought the book to
its present state, with the exception of changes in
the lectionary, which will be noticed below. The result
of the revision was authorised by the Convocations
of Canterbury and York, and its use enjoined
(16th May 1662) by parliament (Act of Uniformity,
14 Carol. II, chap. 4).

A number of noteworthy changes made at the
last revision may be mentioned a new preface
(by Bishop Sanderson); the adoption of the Author-
ised Version for the Epistles and Gospels, the
introduction of the prayer for parliament, of the
prayer 'for all conditions of men,' of the general
thanksgiving, and some of the special thanks-
givings; and the reintroduction in a modified form
of the commemoration of the departed in the com-
memoration service. Of course, a large part of
the prayer-book was preserved intact, very many
minute changes were made, more particularly in
the rubrics. Speaking generally, the changes,
when they possess any distinctive doctrinal colour-
ing, were marked by the dominant influence of the
Scottish Church party. The last form of the prayer-
book is not peculiar to the English Church, but
enjoys a place of authority in the Episcopal Church
of Scotland, a form of the service which is

The English prayer-book is formally declared to be the
'duly authorised service-book of this church for all
the purposes to which it is applicable' (Canon xxxiii.),
but a service for the Holy Communion (brought to
the form in current use in 1794) is sanctioned in
some congregations under certain restrictions.
PRAYER

all consecrations, ordinations, and synods the form in the English prayer-book is required to be used. The Scottish Communion Office is based on the corresponding service in Land's prayer-book, but many important changes have been made. Among the most noteworthy are (1) the transcription of the form of celebration in relation to the prayer for 'the whole state of Christ's Church'; (2) the omission of the words 'militant here in earth'; (3) the alteration in the order of the parts of the prayer of consecration, so that it runs, (a) words of institution, (b) oblation, (c) invocation, in the invocation, of the words, 'that they may become the body and blood,' &c., for 'that they may be unto us the body,' &c. This last change is for its abruptness without parallel or precedent.

For the materials from which the prayer-book has been mainly constructed, consult Maskell's Monumenta Rituale Ecclesiae Anglicanae (3d ed. 1882), and The Ancient Liturgy of the Church of England (3d ed. 1882); Missale ad usum Sarum (Bardinhal ed. 1861-67); Breviarium and Missale (3d ed. 1874-86) by P. Procter; Wordsworth's Breviarium Romanum Quaestionum, edited by J. W. Logie (1888). The successive changes made in the English prayer-book and the Scottish Prayer-book (1662) are exhibited in a convenient form in Keeley's Liturgic Britanniae (2d ed. 1851); they may also be studied in J. Parker's The First Prayer-book of Edward VI, compared with the successive Revisions of the English Prayer-book (1844), and the prayer-book and a commentary on its contents, see Procter's History of the Book of Common Prayer, with a Rationale of its Offices (18th ed. 1880); J. H. Hunt's Annotated History of the Book of Common Prayer (1884); Cardwell's History of Conferences... connected with the Revision of the Book of Common Prayer (2d ed. 1841).

PARKER'S History of the Book of Common Prayer, (1877) is valuable. Cranmer's attempts at a revision of the Breviary is exhibited in Edward VI. and the Book of Common Prayer (1890), by F. A. Gasquet and F. Bishop. Much curious information on the medieval liturgies of England, more particularly that of York, will be found in the Lay Folks' Mass Book, edited for the Early English Text Society by T. E. Simmons (1879). Among commentaries on particular parts of the prayer-book, Scudamore's Notitia Eucharistica (2d ed. 1876) and Bulley's Variations in the Communion and Baptismal Offices (1842) are of much value. The Fasciculus of the Scottish Communion Office, 1563, the Prayers attached to the Act of Uniformity, 1662, were produced in photo-lithograph in 1890. On the history of the Scottish and American Communion Offices, see the writer's A History of the Scottish Communion Office, 2d ed. (1884), and the Historical Sketch, prefixed to Professor S. H. Hart's edition of Seabury's Communion Office (1874).

PRAYER BEADS

a name given to the polished seeds of a West Indian leguminous plant, Abrus precatorius or Wild Liquorice, formerly much used for stringing into rosaries, necklaces, &c.

Praying Wheel, an instrument for offering prayers by mechanical means, used exclusively by the Lamaist Buddhists, on the assumption that the transcendent and infinite, as the result of its repetition. These instruments are of various shapes and sizes, from small cylinders turned by the hand to huge ones driven by water or wind. Long strips of paper with a written or printed formula, which translated reads 'The Jewel in the Lotus', when attached to the cylinder, or when thousands of times, are wrapped round these cylinders, and as the cylinders revolve the paper rolls uncoil, and so the prayer is said.

Preaching, or systematic instruction in religion given by word of mouth, has been almost from the beginning of the Christian church the principal means of disseminating its doctrines, and already its application to the poor is given by our Lord himself as one of the significant signs of the new economy. It is thus distinctively Christian, although it is true that it traces its ancestry to part of the function of the ancient Israelite prophets, who were instructors of the people as to their duties in the present, as well as foretellers of the future. Preaching is, so far as recorded, mostly took the form of the parable, and throughout we find its characteristic marks to be simplicity and variety, some common fact in nature or human experience being taken as the basis of the sermon, and spiritualised in a free and natural manner. Tertullian says, 'Priests, without instituting little, though he inspired much. The discourses given in the Acts also differ widely from modern sermons, their main object being to bring the person and history of Christ plainly before their hearers. The facts of His life, death, and resurrection are everywhere put forward as the roots of Christian faith and practice, and doctrine is ever interpreted without complexity, as practically connected with His person. Justin Martyr (Ap. maj. chap. 67) and Tertullian (Apol. chap. 39) describe the exhortations that followed the reading of Scripture in the Church; but the preacher in the modern sense of the word, although he employed largely the allegorical method of interpreting Scripture, happily now almost extinct. In the early church the bishop was long responsible for the preaching, although presbyters and deacons came to have a share in it. It is difficult to give an historical survey of preaching, its form, its function, and Constantine frequently. Monks were not allowed to preach until the special preaching-orders were organised in the middle ages, nor yet women, although the Montanist heretics permitted them. Sermons were usually delivered on Sundays, as part of the religious rites of the church. The popular instruction was expressed by stamping of feet and clapping of hands, a practice which Chrysostom condemned. After the 9th century preaching appears to have declined, and indeed it never seems to have flourished much. For Tertullian and Origen the ornament of the moral teachings of the preachers was Antony of Padua, Bernard of Clairvaux, Bonaventura, Berthold the Franciscan of Regensburg, John of Monte Corvino, Savonarola, John Tauler of Strasbourg, and Francis Coster (1531-1619). The Reformers were preachers, but the Reformation itself, above all, was new to the world. The new doctrine was in great measure due to the power with which they were given forth from the pulpit. As sacramentarianism lost hold of men's consciences, the higher appeared the value of the new method of learning by what means to draw near to God. Wyclif and his Door Priests, and after him the Lollards, established an evangelical tradition of the supremacy of the pulpit as a means of grace, which we find at its greatest strength in Puritanism. Seventeenth-century preaching was very scriptural, and put prominent in the fore-round the formal evangelical facts of the fall of man, the doom of sin, the redemption of Christ, the sanctifying work of the Holy Spirit. Its strength lay in the reality and vigour with which it realised these truths; its weakness was a tendency to be over-abstract, and to become theological in its religion. The religious culture and barrenness of the 18th century preaching became mainly ethical and apologetical—preaching about Christianity rather than preaching Christ; but, as Dr Johnson says, men at last got tired of hearing the apostles tried once a week for the crime of forgery, and turned for relief to listen to the earnest direct harangues of a Wesley and a Whitefield.
The whole century could show no preachers to be compared with Latimer, Donne, Hall, Andrews, Jeremy Taylor, Howe, Baxter, as well as Fuller, Sanderson, South, Barrow, and Tillotson: still less with their magnificently eloquent French contemporaries Saurin, Bourdaloue, Bossuet, Fénelon, Massillon, La Rnc, and Fléchier. But in the 18th century the voice of the pulpit was heard to speak a stockplatitude of the modern press to the contrary, with such an illustrious roll of preachers as Chalmers, Edward Irving, Robert Hall, F. W. Robertson, Henry Melville, Maurice, Hook, Newmarch, Millet, Pusey, Milman, Parker, Butler, Arnold, Spurgeon, Caird, Guthrie, Beecher, Talmage, Moody, Magee, Liddon, Knox Little, Farrar, Maclaren, Parker, and Phillips Brooks. In France again we find the names of Lacaordaire, Monod, Bersier, and Pressensé; in Germany the Reformation preaching has been choked by Rationalism, but within the century reached its finest flower in Schleiermacher, in whose sympathetic heart there met in strange harmony Pietistic and Rationalist traditions alike. Spener the Pietist, Zollkofer, and Reinhard were earlier German preachers, of whom much may be said.

The modern Church of England has been driven, through the activity of its dissenting rivals, to recognise its neglect of preaching by opening the maces of its cathedrals for special evening services, and now actively employs the pulpit in every parish as a means of spiritual instruction. But whereas he was still recognising it, however, in the words of Dr Hook, as 'a means of instruction, more than a direct means of grace.'

The chief difficulties of the preacher are that he has to speak always to the same hearers—Wesley says he has spoken to himself asleep; his audience is of varying degrees of education and intelligence; his theme is so familiar that it is difficult to compass the grace of novelty—indeed the wonder is rather, as Dr Burnet says, that so many are so good as they are, seeing that the demand in the British Isles alone extends to about 100,000 sermons a week. The foundations of the preacher's success may be said to be his personality, his sincerity, piety, and enthusiasm, his respect and love for his hearers, knowledge of the world in general and of human nature and experience of the world, together with gravity, courage, and intellectual and moral honesty. If to these be added exegetical learning, natural eloquence and fire, with the power of forgetting self in the message to be delivered as an ambassador for Christ, and finally inunction—which, as Vinet says, there is no artificial means of gaining—a preacher of the very highest order is formed. The greatest snare to the young preacher is a not unnatural self-consciousness, and still more the assumption of affectations of voice or action, from which he would quickly shake himself free if he could see how really ridiculous he appears to the pews. The best tonic for his self-consciousness is to be reminded that he himself is but an accident in the vast Christian scheme for the propagation of the gospel, and that the greatest of the apostles was himself content to be nothing so Christ was preached. Happily men without some approximation to a vocation now choose the clerical profession less frequently than formerly, for it is more difficult now to be a Charles Hymonian than it was in our great saint's days. The sovereign law of preaching is to be genuine and natural, for, as Fanst says, 'no heart will take fire if the spark does not come first from the speaker's heart.' In nothing is this ban of unreason to the writer's heart more strongly felt than—of his heart, rather; the high falsetto, the impressive roll, the insinuating whisper, or even whine, are one and all to be abhorred, as suggesting to the ear merely simulated emotions. The best method is to begin from a conversational level, to employ a completely unaffected language and style, and to aim throughout at clearness, all unfair use of the text and unauthorised spiritualising being inadmissible. Plain sensible thoughts in sensible language will still be listened to with attention, if not too long, for the modern hearer endures with difficulty more than thirty to forty minutes, where his fathers expected something at least twice as long. The judicious preacher will seasonally lighten his discourse with illustrations turned to use; but of the graceful, as Fuller says, 'while reasons are the pillars, similes are the windows of every structure.' The same over-witty old divine adds a caution which it can scarcely be said he himself never forgot, 'The preacher avoids such stories whose mention may suggest bad thoughts to the auditors, and will not use a light comparison to make thereof a grave application, for fear his poison go farther than his antidote.' But, while avoiding the grotesque, the preacher must not forget Quintilian's fatal judgment of mediocrity—'his excellence was that he had no mediocrity in his faults,' 'his outstanding excellence.' Jeremy Taylor was a master in the art of illustration, some of his examples being among the most exquisite passages in English prose. The preacher may find his inspiration in the legitimate use of the sermons and other writings of others, no less than in his own experience of life, yet most carefully, still recognising it, however, in the words of Dr Hook, as 'a means of instruction, more than a direct means of grace.'
better ordered discourse and saves the preacher from what to many is a grievous slavery; but Dr James Martineau puts its defence on yet higher grounds as the best means of maintaining the high level of thought and feeling at which the sermon was composed. And it is true that many, perhaps most, extempore preachers forget their arguments and progress, and round off their round, as Coleridge said, in verbiage, vain repetitions, and feeble and garrulous dully. But against this there is the obvious disadvantage in the loss of power and reality that must needs follow the extemporing of pure and emotional thought. The recitation of sermons by heart is scarcely better, if not indeed still more likely to destroy spontaneity and naturalness of expression, not to speak of the risk of some accident depriving the helpless reciter of his memory, as once happened to South, whereupon he left the pulpit abruptly with the words, 'Lord be merciful to our infirmities.' The method of extempore preaching is in every respect the best, provided the speaker's standard of excellence is one sufficiently high, and he is not one of those vain men who make a system of making a sermon into the process of meditation. Provided the sermon has been carefully thought out beforehand, and the preacher has some measure of facility in speech, this method of preaching will be found the most effective, the thoughts being previously methodised, the words and sentences left to the moment. For it is both the most natural manner and it allows speaker and hearers alike to be lifted simultaneously on the same waves of thought and emotion. For, unhappily, there are few men capable of reading a sermon with the same fire and glow as Chalmers. But so long as he keeps himself out of the way of mediocrity and self-possession, 'a great deal of talent is lost to the world for want of a little courage,' says Sydney Smith—and this quality he must possess in a quite unusual degree if he essays the task of preaching to crowds in the open air. The great French preachers, again, recited their sermons, apparently finding it easier than Englishmen do to revive premeditated emotion. Massillon said that his best sermon was the one he knew best; Bondadono, whose memory was apt to give way in presence of any distraction, used to preach with his eyes closed. Leighton begins to preach too soon, and leave off too late;* and still worse for the quality of the sermon is the too frequent necessity for the production of two or more every week. Bishop Andrews said, 'He who preaches twice will prate once; and Robert Hall used to say, 'A man who concentrates his ideas, and thinks out his subject properly, can write one; a diffuse, shallow man may manage two, and a fool might very likely write half a dozen.' Those under the necessity of producing two might well be permitted to make the second a little catechising, as Hume did at Bishopbourne; or an6 easy topics specially directed to children—an admirable new feature of modern preaching; or the second might be frankly allowed to be taken from some great divine, or at least to be merely one of those simpler expositions of religious truth, such as Hooker, who spend their life in their birth, and may have public audience but once.' Over-tasked preachers will find help in those collections of skeleton sermons, of which Simeon's Horse Homiletica (21 vols. 1783-1836) and Spurgeon's Sermon Notes (4 vols. 1884-88) are the best.

As for the form of the sermon, it is usual for it to be divided into an introduction or exordium, the proposition, the proof, and finally the conclusion or peroration. Simeon and his school announced the divisions at the outset; Newman notices them only as he passes from one to the other. As for the logical divisions or heads, in which the Puritan preachers were so prolific—Baxter having as many as 120—the more modern usage is to emasculate these but lightly and to have as few as possible. These are of course all important in the structure of the sermon, for, as Quintilian says, 'Without words, nothing; without order, nothing; even in rerum ordine errare.' George Herbert, in The Country Parson, warns against 'crumbling a text up into small parts; and Bishop Leighton introduced into Scotland the method of preaching without heads—'skimming the text,' as it seemed to the zealous, 'as you would a surface of water, without regard to the shortest, and may take the form of an exegetical connection of text with context—as in Liddon almost always, or an analogy, or an anecdote. The proposition should be clearly set forth, and the proof should follow in logical order, although the heads need not be named. The conclusion, peroration, or application should be an earnest, pointed appeal, warranted by the arguments that have preceded it. 'Hic, si unquam, toto eloquentiae fonte aperiens fas est,' says Quintilian. Indeed, fire and passion we cannot have too much of, if only it is justified in the subject and the connection of the argument, yet allowing the speaker to become the clearer the more he glows. Hume said John Brown of Haddington preached as if Jesus Christ was at his elbow, and James Melville tells us that Knox ere he had done with his sermon 'was like to dig the pulpit in bits, and fly out of it.' Or if a tender closing appeal best fits the subject the speaker must remember that he is a man and not allow himself to be dissolved in tears, unless he needs must, when nature will save him from being ridiculous. Bishop Heber converted the closing peroration into a sermon. In the expository discourse, technically known in Scotland as 'a lecture,' the preacher takes a series of texts or a whole passage, and opens up its meaning, the central truth being clearly set forth, and the minor truths in their relation to it.

Many of the older preachers of the evangelical persuasion never closed a single sermon without a noisy course round the whole range of cardinal doctrines in the scheme of salvation, however wide some of these might lie from the subject proper of the text. This might be well for itinerating preachers like Ainslie or Wesley, who almost certainly never address the same hearers again; but is manifestly absurd in the case of a parish clergyman whose duty is to instruct the saints as well as to raise the unconverted, and who speaks to the same people twice a week. Those preachers whose sermons invariably deal with the initiatory stages of Christian experience sometimes arrogantly claim for themselves a monopoly of preaching Christ.' No phrase has been more abused than this of St Paul's, which has been twisted to mean a mountain view of the necessary conditions of the starting-point only of a Christian experience, as if the pupils of a school were to stand still at their primer because one had not yet learned to spell. But indeed there is too little variety in our teaching,—'We hold a few texts,' say the parsons, 'which hide the rest of the Bible.' Still less profitable were those weekly tirades against the Socinians, the Scarlet Woman, or Prelacy, forced into the conclusion of every sermon by many a painful old Presbyterian divine. Even hell lost its terrors when men no longer showed the personal aspect of the devil, once familiar, became contemptible. But the pains of hell have furnished the fuel for many a noble sermon, even without such a special accessory as Fuller tells us belonged to Mr Perkins, who 'would pronounce the word damn with such an emphasis as left a doleful echo in his
auditors' ears for a good while after.' The autobiographical style is a persistent snare to young converts in their preaching, forgetting how diverse are human character and conditions, how complex is Christian experience, and how large and varied was Christ's own conception of the Kingdom of heaven. The most alarming danger to the pupil in the present day is, however, a manfull hysterical style of treating religions truths, natural enough in a society debauched with the over-excitement and fever of an age of composition, but ultimately fatal to the dignity and authority of a venerable institution, the real foundations of which must be mastery over emotion and firmness of intellectual fibre, as well as comprehensive grasp of the truths revealed by Jesus Christ.

See Dr J. M. Neale, *Medieval Preachers and Preaching* (1857); Rev. S. Harling-Gould, *Post-medieval Preachers* (1865); Lothe, *Geschichte d. Predigt von Anfang bis auf Schleiermacher* (Bremen, 1881); the Rev. G. J. Davies, *Preachers, Past and Present* (1885); Professor Mahaffy, *Decay of Modern Preaching* (1889); Professor John Kerr's *fragmentary Lectures* (1887); the treatises on Homiletics by Vinet (1858), Kidder (1864), Heppin (1869), and Halkie (1875); also the excellent series of Yale lectures by Oliphant, Stander, Dale, and others.

**Pre-Adamites. See ADAM.**

**Prebend. See CATHEDRAL.**

**Precedence,** the order in which individuals are entitled to follow one another in a state procession or on other public occasions. In England the order of precedence depends partly on the statute of 1539, partly on subsequent statutes, royal letters-patent, and ancient usages. Among questions of precedence depending on usage there are some which can hardly be considered as settled by the statute, and are in a great degree left to the discretion of the crown, which generally refers any disputed question to the officers of arms. In Scotland the Lyon Court has the direct jurisdiction in all questions of precedence.

It is a general rule of precedence that persons of the same rank follow according to the order of the creation of that rank; and in the precedence of the English peerage it has been fixed that the younger sons of each preceding rank take place immediately after the eldest son of the next succeeding rank. Married women and widows take the same rank along with each other as their husbands, except such rank be professional or official, and it is an invariable rule that no office gives rank to the wife or children of the holder of it. Unmarried women take the same rank with their eldest brother; the wife of the eldest son, eldest of brothers, however, preceding the sisters of her husband and all other ladies in the same degree with them. Marriage with an inferior does not take away the precedence which a woman enjoys by birth or creation; with this exception, that the wife of a peer always takes her rank on her husband, and her heirs. The following tables exhibit the precedence of different ranks as recognised by law in England.

**Table of Precedence Among Men.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Prince of Wales.</td>
<td>Younger sons.</td>
<td>Earls' eldest sons.</td>
</tr>
<tr>
<td>The Sovereign's brothers' or sisters' sons.</td>
<td>Viscount.</td>
<td>Viscount.</td>
</tr>
<tr>
<td>Lord High Chancellor, or Lord Keeper, being a Baron.</td>
<td>Privy-counsellor.</td>
<td>Speaker of the House of Commons.</td>
</tr>
<tr>
<td>Lord High Constable.</td>
<td>Lord High Constable.</td>
<td>Lord High Constable.</td>
</tr>
<tr>
<td>Lord High Admiral.</td>
<td>Lord High Admiral.</td>
<td>Lord High Admiral.</td>
</tr>
<tr>
<td>Lord Chamberlain of H.M. Household.</td>
<td>Above all their degrees.</td>
<td>Above all their degrees.</td>
</tr>
</tbody>
</table>

**Table of Precedence Among Women.**


**Baronets.**

**Bannerets not made by the Sovereign in person.**

| Knights Grand Crosses of St Michael and St George. | Knights Grand Crosses of St Michael and St George. | Knights Grand Crosses of St Michael and St George. |
| Knights Commander of the Star of India. | Knights Commander of the Star of India. | Knights Commander of the Star of India. |
| Knights Commander of the Star of India. | Knights Commander of the Star of India. | Knights Commander of the Star of India. |
| Knights Commander of India. | Knights Commander of India. | Knights Commander of India. |
| Knights Commander of India. | Knights Commander of India. | Knights Commander of India. |
| Knights Commander of India. | Knights Commander of India. | Knights Commander of India. |
| Knights Commander of India. | Knights Commander of India. | Knights Commander of India. |

**Companions of the Distinguished Service Order.**

| Eldest sons of Knights, according to their fathers' precedence. | Eldest sons of Knights, according to their fathers' precedence. | Eldest sons of Knights, according to their fathers' precedence. |
| Eldest sons of Knights. | Eldest sons of Knights. | Eldest sons of Knights. |
| Eldest sons of Knights. | Eldest sons of Knights. | Eldest sons of Knights. |
| Knights' younger sons. | Knights' younger sons. | Knights' younger sons. |
| Knights' younger sons. | Knights' younger sons. | Knights' younger sons. |

**Gentlemen.**


389
At the coronation of Charles I, the rule of precedence of the nobility of England was introduced in Scotland; and it was arranged that peers of England (or their sons, &c.), of a given degree, should within England take precedence of peers of the same degree. In that in Scotland this precedence should be reversed. But the acts of Union with Scotland and Ireland the precedence in any given degree of the peerage has been established as follows: (1) Peers of England; (2) Peers of Scotland; (3) Peers of Great Britain; (4) Peers of Ireland; and (5) Peers of the United Kingdom, and Peers of Ireland created subsequently to the Irish Union. A similar order is understood to obtain in regard to baronets, though in Ireland it seems rarely to have become established that all baronets to rank according to the respective dates of their patents.

The following is the table of precedence in Scotland, as recorded in the Lyon Office. It is founded partly on usage and partly on the statutes of 1623 and 1661.

<table>
<thead>
<tr>
<th>Precedence</th>
<th>Scottish</th>
<th>Irish</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lord High Commissioner of General</td>
<td>Lord High Commissioner of General</td>
</tr>
<tr>
<td>2</td>
<td>The Prince of Wales</td>
<td>The Prince of Wales</td>
</tr>
<tr>
<td>3</td>
<td>Younger sons of the Sovereign</td>
<td>Younger sons of the Sovereign</td>
</tr>
<tr>
<td>4</td>
<td>Grandsons of the Sovereign, including sons of daughters</td>
<td>Grandsons of the Sovereign, including sons of daughters</td>
</tr>
<tr>
<td>5</td>
<td>Brothers of the Sovereign</td>
<td>Brothers of the Sovereign</td>
</tr>
<tr>
<td>6</td>
<td>Uncles of the Sovereign</td>
<td>Uncles of the Sovereign</td>
</tr>
<tr>
<td>7</td>
<td>Nephews of the Sovereign, including sons of sons</td>
<td>Nephews of the Sovereign, including sons of sons</td>
</tr>
<tr>
<td>8</td>
<td>Lord Provost of Edinburgh within the city</td>
<td>Lord Provost of Edinburgh within the city</td>
</tr>
<tr>
<td>9</td>
<td>Hereditary High Constable</td>
<td>Hereditary High Constable</td>
</tr>
<tr>
<td>10</td>
<td>Master of the Household</td>
<td>Master of the Household</td>
</tr>
<tr>
<td>11</td>
<td>Lord Chancellor, or Lord Keeper, if Baron</td>
<td>Lord Chancellor, or Lord Keeper, if Baron</td>
</tr>
<tr>
<td>12</td>
<td>Dukes</td>
<td>Dukes</td>
</tr>
<tr>
<td>13</td>
<td>Eldest sons of Dukes of the Blood Royal</td>
<td>Eldest sons of Dukes of the Blood Royal</td>
</tr>
<tr>
<td>14</td>
<td>Marquises</td>
<td>Marquises</td>
</tr>
<tr>
<td>15</td>
<td>Eldest sons of Dukes</td>
<td>Eldest sons of Dukes</td>
</tr>
<tr>
<td>16</td>
<td>Earls</td>
<td>Earls</td>
</tr>
<tr>
<td>17</td>
<td>Younger sons of Royal Dukes</td>
<td>Younger sons of Royal Dukes</td>
</tr>
<tr>
<td>18</td>
<td>Eldest sons of Marquises</td>
<td>Eldest sons of Marquises</td>
</tr>
<tr>
<td>19</td>
<td>Younger sons of Dukes</td>
<td>Younger sons of Dukes</td>
</tr>
<tr>
<td>20</td>
<td>Viscounts,</td>
<td>Viscounts,</td>
</tr>
<tr>
<td></td>
<td>Earl-mothers of Earls</td>
<td>Earl-mothers of Earls</td>
</tr>
<tr>
<td>21</td>
<td>Younger sons of Marquises</td>
<td>Younger sons of Marquises</td>
</tr>
<tr>
<td>22</td>
<td>Barons</td>
<td>Barons</td>
</tr>
<tr>
<td>23</td>
<td>Keeper of the Great Seal</td>
<td>Keeper of the Great Seal</td>
</tr>
<tr>
<td>24</td>
<td>Keeper of the Privy Seal</td>
<td>Keeper of the Privy Seal</td>
</tr>
<tr>
<td>25</td>
<td>Eldest sons of Viscounts</td>
<td>Eldest sons of Viscounts</td>
</tr>
<tr>
<td>26</td>
<td>Younger sons of Earls</td>
<td>Younger sons of Earls</td>
</tr>
<tr>
<td>27</td>
<td>Eldest sons of Barons</td>
<td>Eldest sons of Barons</td>
</tr>
<tr>
<td>28</td>
<td>Knights of the Garter</td>
<td>Knights of the Garter</td>
</tr>
<tr>
<td>29</td>
<td>Privy-councillors</td>
<td>Privy-councillors</td>
</tr>
<tr>
<td>30</td>
<td>Lord Justice-general</td>
<td>Lord Justice-general</td>
</tr>
<tr>
<td>31</td>
<td>Lord Clerk-register</td>
<td>Lord Clerk-register</td>
</tr>
<tr>
<td>32</td>
<td>Lord Advocate</td>
<td>Lord Advocate</td>
</tr>
<tr>
<td>33</td>
<td>Lord Justice-clerk</td>
<td>Lord Justice-clerk</td>
</tr>
<tr>
<td>34</td>
<td>Lords of Session (by date of appointment)</td>
<td>Lords of Session (by date of appointment)</td>
</tr>
<tr>
<td>35</td>
<td>Knights Bannerets</td>
<td>Knights Bannerets</td>
</tr>
<tr>
<td>36</td>
<td>Younger sons of Viscounts,</td>
<td>Younger sons of Viscounts,</td>
</tr>
<tr>
<td></td>
<td>younger sons of Earls,</td>
<td>younger sons of Earls,</td>
</tr>
<tr>
<td></td>
<td>younger sons of Barons,</td>
<td>younger sons of Barons,</td>
</tr>
<tr>
<td></td>
<td>Knights Marischal</td>
<td>Knights Marischal</td>
</tr>
<tr>
<td></td>
<td>Barons</td>
<td>Barons</td>
</tr>
<tr>
<td></td>
<td>Knights of the Thistle</td>
<td>Knights of the Thistle</td>
</tr>
<tr>
<td></td>
<td>Grand Cross of the Bath</td>
<td>Grand Cross of the Bath</td>
</tr>
</tbody>
</table>

It seems to be held in England that the precedence of Scottish officers of state, judges, &c., as recognised before the Union, does not extend beyond Scotland. There are rules for precedence for the members of the different professions, recognised among themselves, but which give no general social precedence. No rank, for instance, in the army, however high in itself, entitles it to the holder to precedence. Doctors in the universities are ranked thus: (1) Divinity, (2) Law, (3) Medicine. Official rank may often place its possessor, upon occasion of public ceremonies, in a position far above others of higher dignity than himself, but this, of course, confers no rank in the general order of civil precedence; on the other hand, men of official rank, who have higher personal precedence, are placed according to the latter; the wives and children of all who derive their places on the scale from official rank have no consequent privilege. One of the leading principles of the law of precedence is that it enunciates solely from father or husband, and cannot be acquired through a female unless in the case of a peeress in her own right.

Preceptor (sometimes Cantor), the officer who directs the singing in a cathedral or parish church. See Choirs and Choral Singing.


Preceptory, the name given to certain houses of the Knights Templars (q.v.), the superiors of which were called Knights Preceptor. Other houses of the order were called commanderies.

Precession, the name given to a slow motion of the earth, under the action of the sun and moon, which causes the poles of the heavens (which must remain always vertically above the poles of the earth) to describe circles on the sphere of the heavens about the poles of the ecliptic as centres. As the places of stars on celestial charts are marked with reference to the celestial poles, this motion of these poles causes all such charts to become less and less accurate with the lapse of time. A correction for precession has therefore to be applied to such charts in order to find the true places of stars at any epoch other than that for which they are constructed. This motion of the earth also causes the Equinoxes (q.v.) to recede slowly along the ecliptic, so that the sun comes to them, in his annual course, a little earlier each year. Hence the name Precession of the Equinoxes.

The physical cause of this motion is the attraction of the sun and moon for the protuberant part of the earth around the Equator (see Earth). This causes the earth slowly to turn on itself, as a spinning top gy rates when its speed slackens before it falls. As this disturbing force on the earth is small relatively to its mass, this turning takes place at the mean rate of only 501 per annum. It requires, therefore, 25,808 years for the equinoxes to describe a complete circle on the ecliptic. For a very interesting case of the effect of precession, see Pole-Star. In actual observation the effects of precession are complicated with those of Nutation (q.v.) and of change of inclination of the ecliptic. The subject is pretty fully discussed in a popular manner in Herschel's Treatise on Astronomy. For the suggested influence of precession, along with the increased eccentricity of the earth's orbit, or great climatic changes on the earth, see Pleistocene, p. 236.

Precenses. See Rambouillet.

Precious Stones. See Stones (Precious).

Precipitate Ointment is of two kinds, the red and the white. The former contains red oxide of mercury, the latter ammoniated mercury, or white precipitate. In both cases great care is necessary that the mercury preparations are in a very fine state of division, and are intimately mixed with the ointment base. Both ointments are highly stimulating, and are of service in cutaneous eruptions. The red ointment is also employed in chronic conjunctival opthalmia.

Precipitation, in Chemistry, is an operation in which decomposition occurs in a fluid, either through the action of the air, or of a gas, or of a chemical agent, or by solution; it is also produced by the deposition of a solid substance that was either previously held in solution or that has been formed by chemical action.

Precognition. See Criminal Law (Scots).
Predestination, the eternal decree of God whereby 'the elect' are foreordained to salvation. The correlative decree, whereby others are held to be foreordained to perdition, is commonly distinguished by the other term—Reprobation. The theory of predestination had its origin in the attempt of theological system to define the relations of the creatures to the Creator, and to reconcile the phenomena of human freedom with the belief in divine omnipotence. God's absolute will is represented by it as determining the eternal destiny of man, not according to the foreknown character of those whose fate is so determined, but according to God's own mere choice. They who are thus foreordained to eternal life are led to believe and live by the 'irresistible grace' of the Holy Spirit. In human salvation, therefore, God's will is everything, man's nothing. The principal scripture passage is Rom. viii. 29, 30; what was in the discussions between Pelagius and Augustine that the predestinarv view of the divine 'decree' was first fully evolved; and since their time opinion in the church has run in two great currents—the one perpetuating the influence of Pelagius, who regarded man as inborn free, and ordained to a divine foreknowledge of human character; the other that of Augustine, who maintained the absolutism of that decree, and its independence of all prior human conditions. Pelagius recognised a possibility of good in human nature; Augustine denied it. This possibility, apart from the influences of divine grace. The one held that the choice of salvation lay in man's will; the other that man's will had no active freedom or power of choice since the fall. In 529 the system of Augustinianism was approved by the Council of Ephesus, and Athanasius (Orange) as the rule of orthodoxy in the Western Church; but the reaction against the strictly logical nature of his dogma has been perpetually manifested by representatives of the more humane, though perhaps less logical doctrine of Pelagius, in every period. St. Bonaventure, a Grandi monk of the 9th century, carried the doctrine to its most extreme development. The Thomists (see Aquinas), as predestinarians, opposed the Scotch, though Thomists insisted that God willed the salvation of all and has provided the means. This was reformed by Zwingle and permitted. But the Augunarians, though the Lutheran doctrine as formulated by Melanchthon is plainly different from that of Calvin and the Reformed Church. Some Jesuits are Conformists or modified Thomists; others admit that predestination to glory, is irrespective of merit. Jansenism was a revival of Augustinianism. Arminius and the Synod of Dort mark a new period of the controversy. With such opposite representatives as Land and Hales, a large part of the Church of England has held Calvin good-night. The followers of Wesley and Whitfield differed on this great doctrine. Even the Presbyterian churches, or large sections of them, have modified their high predestinarian doctrine in at least the statement of it. The common Augustinian doctrine of faith and election 'of the elect'; moderate Calvinists or 'sub-lapsarians' held that the fall of man (lapsus) was foreseen but not decreed by God (thus trying to avoid ascribing to God the origin of sin); while extreme predestinarians or 'supra-lapsarians' affirm that both were decreed. God decreed the fall of man, overruling it for good. Jonathan Edwards (q.v.) is a modern representative of rigid Calvinism. Catholics hold that the question is one rather of metaphysics than of faith. See the article Will and works there quoted, and the articles on Augustine, Pelagius, Calvin, Jansen, &c.; the theological handbooks of dogmatic history: Freiin Willen (1863); Forbes, Predestination and Freewill (1878); Canon Mozeley, Treatise on the Augustinian Doctrine of Predestination (1878).

Predicables. This is a term in the scholastic logic connected with the scheme of classification. There were three kinds of universals: the first, comprising objects on a systematic plan: genus, species, difference (differentia), property (pronom), and accident (accidentem). The first two—Genus and Species—name the higher and lower classes of the things classified; a Genus comprehends several Species. The other three designations—Difference, Property, Accident—express the attributes that the classification turns upon. The Difference is what distinguishes one species from the other species of the same genus; as, for example, the peculiarities wherein the cat differs from the tiger, lion, and other carnivores. The Property expresses a distinction that is not ultimate, but a consequence of some other peculiarity. Thus, 'the use of tools' is a property of man, and not a difference, for it flows from other assignable attributes of humanity and mental organisation, or from the specific difference that characterises him. The Accident is something not bound up with the nature of the species, but chancing to be present in it. Thus, the high value of gold is an Accident; gold would be gold though it were plenty and cheap. See Categories, Generalisation.

Pre-emption. In the United States, under the Pre-emption Act of 1841, an actual settler on the public lands enjoys the right, in preference to any one else, of purchasing at a fixed price the land on which he has settled, to the extent of not more than 160 acres. In the case of 'offered' lands the settler must file his 'declaratory statement' within thirty days after entry, and within a year proof must be made of settlement and cultivation, and the land thereupon paid for, at $1.25 per acre if outside the limits of a railroad grant, or $2.50 if within such limits. If the tract settled on is 'unpatented,' an approved plan of the township must first be received at the district land office; the statement must then be filed within three months, and final proof and payment must be made within thirty months thereafter. Title to land is thus obtained much sooner (possibly within six months) than under the homestead laws (see Homestead); for a homestead settler may at any time after six months purchase the land under the pre-emption laws; as, on the other hand, the holder of a pre-emption claim may convert it into a homestead.

Pre-established Harmony. See Leibnitiz.

Pre-existence, Doctrine of. The notion that human souls were in existence before the generation of the bodies with which they are united in this world was anciently, and is still, widely spread throughout the East. The Greek philosophers, too, especially those who held the doctrine of transmigration, as the Pythagoreans, Empedocles, and even Plato—if with him transmigration is a system rather than a doctrine—were familiar with the conception. Plato taught that all human souls had existed from the very beginning, still and silent, in the realm of potentiality, and Origen introduced the theory into Christian theology. The dogma of the assumption of the divine and the angelic humanity—was a difficulty in the relations between the two natures in pre-existence. Yet the belief continued to survive, and we find it in Scotus Erigena, in the
Youthful Fichte, in Glanvil and Henry More, and in the profoundest works of modern theology— Müller's" "Deorationis, of Sis—where it forms a basis for the doctrine of hereditary sin. Among the early Christians the assumption of such pre-existence was connected with the belief that God had created the souls of men before the world, and that these were united with human bodies at generation or at birth. Another view long prevalent in the Western Church was that of Traducianism, according to which children received soul as well as body from their parents through natural generation. The third theory, which ultimately became that on which the orthodox was Creationism, according to which each soul is created successively. Direct intellectual interest in the doctrine of pre-existence has nearly altogether ceased in modern times, yet the dream has again and again haunted individual thinkers. Almost every one is familiar in dreams, and even in a waking state, with a haunting sense of a want of reality in the common objects around, and a vague consciousness that everything one sees or hears has happened before, when we, in the words of Tennyson,

To lase far back in a confused dream
To an instinctual simile.

There is a striking expression of this experience in Sir Walter Scott's Diary, under February 17, 1829, and there is an interesting allusion to the same subject in a well-known passage in Guy Mannering.

And Wordsworth has given supreme poetical expression to it in his famous ode—Intimations of Immortality from Recollections of Early Childhood (the germ of which will be found in a less known poem of Vaughan the Silurist):

Our birth is but a sleep and a forgetting;
The soul that rises with us—our life's star
Hath had elsewhere its setting,
And cometh from afar.
Not in entire forgetfulness,
Not in utter nakedness,
But trailing clouds of glory do we come
From God, who is our home.

Prefect (Fr. préfet, from Lat. praefectus; see Prefect), the administrative head of a modern French department (see France, Vol. IV. p. 775), whose action is independent of that of the old Intendant before the Revolution.

Pregnancy. The first symptom which calls attention to the occurrence of pregnancy is usually absence of the menstrual flow. This may, of course, be suppressed by many other causes; and, exceptionally, may persist during the first few months of pregnancy. "Quicking," or the sensations experienced in consequence of the movements of the fetus, is usually noticed in the fourth month. Of the changes which take place elsewhere than in the generative organs the first and most noticeable is sickness, usually occurring in the early morning, and not persisting beyond the first three months. "Longing" for salt, and, sometimes, very curious articles of diet, are not unusual. The heart becomes enlarged in order to provide the increased blood-supply necessary for the nutrition of the fetus. There is often an increased liability to toothache, fainting, and other disturbances of health in either direction are common, nausea is naturally altered, and an unnatural fretfulness or irritability manifests itself. In some cases, on the other hand, the health is exceptionally good. The duration of pregnancy is, in the great majority of cases, about 270 days; but, as variations of a week or ten days in either direction are common, it is not possible to predict the exact date of delivery. Well-authenticated cases have occurred where it has been prolonged to nearly 300 days. It may, of course, come to an end at any time prior to its proper term (see Fetus). There is a curious condition called spontaneous pregnancy, which essentially simulates true pregnancy in all its main features as entirely to deceive the patient as well as others. It is generally associated with Hysteria (q. v.) or some allied mental disturbance (see Mary L., and Southcott). A careful examination enables a medical man to detect the palpitation, but it may be difficult to persuade the patient and her friends of it. As a work of reference for others than specialists, Chavasse's Advice to a Wife on the Management of Her Health (1842; new ed. 1889) may be recommended.

Congenital pregnancy is a criminal offence, or rather it is taken to be the main proof of the offence of concealing the birth of a child in certain circumstances. See Birth.

Prehnite, a hydrous silicate of alumina and lime, the alumina usually partly replaced by ferric oxide. It is a widely diffused mineral, and, although first discovered at the Cape of Good Hope, has been found in great beauty in some places on the continent of Europe, and in Scotland. It occurs in a great variety of forms, being found in crystals in fan-shaped and cockcomb-like groups, granular, reniform, fibrous, &c. It is sometimes colourless, but more generally greenish, and sometimes yellowish. It occurs, as a product of the alteration of various rocks, in veins and in various igneous rocks, such as diorite, porphyrite, &c. Less commonly it is met with under similar conditions in granitoid and schistose rocks, and occasionally in lodes associated with copper.

Prejevalski, Nicholas, Russian traveller, was born in the government of Smolensk on 31st March 1839. He entered the army (1855), and took part in quelling the Polish insurrection of 1861. Having joined the general staff in 1867, he was moved to Siberia. There he began to satisfy his longing for travel by exploring the Usri region, south of the Amur. This, however, was a small thing in comparison with his subsequent labours in geographical exploration. The three years 1871-73 he spent in travelling from Peking through southern Mongolia (region of the Ordus) to the Ala-shan, Koko-nor, and the upper waters of the Yang-tze-Kiang. Four years later he made the first of the journeys undertaken with the hope of reaching Lhasa in Tibet, but he once more crossed the Desert of Gobi, and got as far as the upper Yang-tze-Kiang, but, not being able to cross it or travel down it, was obliged to return. He died at Karakol, on the east side of Lake Issyk-Kul in West Turkestan, just starting on his fifth expedition to Central Asia. His papers and notes brought back from these journeys most valuable collections of animals and plants, now all preserved at St Petersburg: amongst other things that he discovered were the wild camel and the wild horse, the ancestors of the domesticated varieties. His last possible work was published in the Proceedings of the St Petersburg Geographical Society, in Petersmann's Mittheilungen, and other journals, as well as in two independent Russian works (1875 and 1883). See Nature
Prelate (Lat. prelatus, ‘one set over’), in Church law, is the name given to the holders of those higher dignities in the church, to which, of their own right, is attached a proper jurisdiction, not conferred by delegation from any superior official. In this sense the name comprises not only prelates of the first class, as bishops, but also the heads of religious orders, abbots or priors of religious houses, and other similar ecclesiastical dignitaries. In the pope’s court and household many of the officials, although not possessing an ecclesiastical dignitary, have the insignia and title of prelate; and these honours are frequently bestowed on clergy whose duties keep them far from Rome.

Prelude (Lat. pre, ‘before,’ and ludo, ‘I play’), the introductory movement of a musical work (see INTRODUCTION). The first movement of a sonata was usually a prelude; and the term is especially associated with the preludes prefixed by Bach to his celebrated clavichord and organ fugues. It has also been applied, without special significance, by Chopin to his collection of short pieces, op. 28. Its form is indeterminate, but the piece is always in the same key as that succeeding it.

Premature Interment. See BURIAL.

Premature Labour. See ABORTION, FETUS, BIRTH.

Premier. See TREASURY, CABINET.

Pre-millenarian. See MILLENNIUM.

Premonstratensians (called also Norbertines), an order of regular canons, founded by St. Norbert, a canon of Cleves, in 1119, at a place in the forest of Conyé, pointed out in a vision, and thence called Prémontré (Lat. Prætotum Monstratum, ‘the meadow pointed out’). Their habit was white, hence in England they were commonly called the White Canons. Norbert organised his new order, which was substantially a branch of the Canons Regular of St Augustine, as a means of reforming the monastic members as to their usefulness in effecting the reformation of the age. Himself a man of remarkable piety and austerity of life, his rule is a return to the primitive fervour of the monastic institute; and the great work which he proposed for his brethren is captured in the words: ‘in the churches of the world, the service of the people, and the direction of consciences in the confessional. It was taken up with ardour, and spread rapidly in France and the Low Countries, and afterwards—on Norbert’s being chosen, in 1157, Archbishop of Magdeburg—in Germany; the abbot of the mother-house at Conyé, however, retaining the rank of general and of superior of the entire order. In 1512 all the abbeys in England and Wales were placed under the Abbot of Welbeck. There, just before the Reformation, were thirty-five houses; in Scotland there were six, one of them Dryburgh. It does not seem at any time to have made much progress, or at least to have established many houses, in Italy or Spain. In the same spirit of reformation Norbert established an order of canons regular, the Premonstratensians, of which he was the first superior. Helyot states that at one time there were as many as a thousand Premonstratensian abbeys, besides provostships and priories, and 500 houses of nuns, mostly in France, Germany, and the northern kingdoms. Lecuy, the last abbot of Prémontré, died at the time of the French revolution, was one of the subscribers at the Revolution, and even in Germany, Belgium, and Austria there remain only miserable fragments of their former splendour. Small communities have been revived at Crowle and Spalding in Lincolnshire and at Storrington in Sussex.

Prentice Pillar. See ROSLIN.

Prenzlau, or Prenzlow, an agricultural town of Prussia, stands at the northern end of Lake Ucker, 67 miles by rail N.E., of Berlin. It has a beautiful Gothic church (1325-40). Pop. (1895) 19,689.

Pre-Raphaelitism. English art of the 18th century had in its genesis one national peculiarity. There being no demand for it from church or state, it had to find a market amongst the younger men, and especially amongst the middle classes, who, in the wants of the people, Hogarth, the first distinctly national subject-painter, found his themes in the social manners of his day, which were valued by the true instinct of the common people. Portrait-painters of national origin had been before his time; but these, good though bad wits, had been followers of foreign masters introduced by the court and supported by its patronage. That art other than architecture was not necessarily an exotic in England is proved convincingly by the many beautiful examples of monumental portraiture produced by native workmen before the Wars of the Roses. The bronze effigies of Henry III. and Queen Eleanor in Westminster Abbey were executed by William Torel, citizen of London, in 1291-92, and those of Richard II. and Queen Anne of Bohemia, in 1395-97, by the brokers of the cooperersmiths and citizens of London, in 1395-97. Austin of London furnishes an excellent and later example of this in his monumental tomb in the Beauchapel Church, Warwick. These works, followed as they were by the Reformation and in quick succession by the parliaments and monopolies, extinguished the native art and necessitated the calling in of foreign aid; for it must be remembered that under the happiest conditions a native artist cannot be produced in less time than a full generation.

Hogarth having once arisen with full daylight of an independent inspiration, it was no longer possible for the mannered reproductions of the imitators of Kneller and Lely to satisfy the spirit of an age now awakened from its long sleep. Hogarth at first gained a footing by portraiture, and when he had earned sufficient for his paintings. In the end, however, he left the service of the church, was the practical instruction of the people, and the direction of consciences in the confessional. It was taken up with ardour, and spread rapidly in France and the Low Countries, and afterwards—on Norbert’s being chosen, in 1157, Archbishop of Magdeburg—in Germany; the abbot of the mother-house at Conyé, however, retaining the rank of general and of superior of the entire order. In 1512 all the abbeys in England and Wales were placed under the Abbot of Welbeck. There, just before the Reformation, were thirty-five houses; in Scotland there were six, one of them Dryburgh. It does not seem at any time to have made much progress, or at least to have established many houses, in Italy or Spain. In the same spirit of reformation Norbert established an order of canons regular, the Premonstratensians, of which he was the first superior. Helyot states that at one time there were as many as a thousand Premonstratensian abbeys, besides provostships and priories, and 500 houses of nuns, mostly in France, Germany, and the northern kingdoms. Lecuy, the last abbot of Prémontré, died at the time of the French revolution, was one of the subscribers at the Revolution, and even in Germany, Belgium, and Austria there remain only miserable fragments of their former splendour. Small communities have been revived at Crowle and Spalding in Lincolnshire and at Storrington in Sussex.

Prenzlau, or Prenzlow, an agricultural town of Prussia, stands at the northern end of Lake Ucker, 67 miles by rail N.E., of Berlin. It has a beautiful Gothic church (1325-40). Pop. (1895) 19,689.
Opie, Girtin, Blake, Lawrence, Stothard, Constable, Wilkie, Haydon, De Wint, Crome, Turner, Leslie, and not less in the decorative designs of houses by the Adams brothers, in Wedgwood ware, in gold and silver work, and in furniture.

It is rarely that any cause for rejoicing may be found in the world; and certainly at the beginning of the 19th century, but undeniably it did bring great things for the strengthening of English character, and this was the case in no direction more surely than in that of art. When in the peace of 1814 the Continent was thrown open, it is noted by three great painters; Holman Hunt, Millais, and Rossetti. Their English character is supreme in painting among the nations, and this verdict was endorsed by the judgment of many able foreigners. The selection of Sir Thomas Lawrence to paint the members of the Holy Alliance is a convincing proof of this opinion, and the recognition of Constable by France in 1820 is further evidence to the same effect. But alongside of virtuous influences there had been at work a deadly academic dogma which the few far-seeing of that generation recognised as threatening destruction to the still struggling English art, and which had already completely destroyed decorative design. To glance at the members' lists of exhibitions of that day and to recognise how many then held great art are now completely unknown, brings this to the proof. These painters were creatures of orthodox rule, life, and system, seeing whose influence Constable in 1821 prophesied 'in thirty years English art will cease to exist.' Following up this forecast of the great landscape-painter, Leslie thirty years later finds the fulfilment of Constable's prediction in the death of Turner.

It is managed for the young generation to find out what lay at the root of the decay and its remedy. How to get free from the prejudice which blinds the eye to established errors is the preliminary problem to effecting all reformation. The attempt made in Germany in the beginning of the century to cultivate what was called 'Early Christian Art,' was participated in by W. Dyce, D. Maclise, and a few other artists in England. But for youthful seekers after a perfect method these efforts, even where they expressed much of English individuality, were not unboundedly promising, because they failed to put flesh on the theory. One of the earnest young students of the day was William Holman Hunt, who, already feeling his way as a practical painter, was led by circumstances to study in exceptional degree the works of the greatest old masters, and he perceived that in every school progress ended when the pupils derived their manner through dogmas evolved from artists systems rather than from principles of design taught by nature herself. He determined therefore, for his own part, to disregard all the arbitrary rules in vogue in existing schools, and to seek his own road in art by the way of nature. Many masters had founded their sweetness and strength of style. Without any idea of 'forming a school,' but for his own development alone, he began to study with exceptional care and frankness those features of nature which were generally starved over as unworthy attention; and to this purpose he found most timely encouragement in the enthusiastic outburst of Ruskin's appeal to nature in all vital questions of art criticism, as expressed by him in Modern Painters. This period an increasing intimacy was cemented between him and Ford Madox Brown, aged nine, and John Everett Millais, who was already at the age of seventeen the precociously efficient medal student of the Royal Academy and an emulator of the pseudo-classical Ety. This youthful friendship led to frequent consultations over the needs of the growing generation of artists, and Millais declared his confidence in the closer study of nature, which he determined to adopt as soon as work to which he was committed should be completed.

Dante Gabriel Rossetti was at this time also fascinated with the newly-revised principles of art striving after nature, but he had not yet become a practical painter, and there was no certainty that he would do so. He had, before his intimacy with Holman Hunt, begun the study of art under Ford Madox Brown, a painter who had distinguished himself by the most admirable contributions to the Westminster Hall competition, works which Rossetti had the independent good sense to admire. In the year 1848 (when Holman Hunt was engaged on a picture of Rienzi, of which he had already completed the painting of the landscape from nature, and other complicated preparatory work) D. G. Rossetti placed himself with Holman Hunt in his studio in Cleveland Street, where he followed a course of study specially devised for him by the older student to enable him to cope with the difficulties of a picture undertaken in pure experiments. Thus he was finally he is completed; this picture is now well known as The Birthday of the Virgin.

Millais, on his part, forthwith took for his first subject to be treated on the new principles a design from Keats's Isabella. This was originally intended for one of the Royal Academy exhibitions of that year, but was formed into a band called the Pre-Raphaelite Brotherhood, had undertaken to publish. It is the justly famous picture now in the Liverpool Art Gallery.

The three artists, as representing the pre-Raphaelite body, appeared in the exhibition season of 1849, Millais with Lorenzo and Isabella, Holman Hunt with Rienzi, Rossetti with The Girlhood of the Virgin, and excited the most flattering attention; but by the following year a storm of enmity of the most bitter kind was raised against them. Their pictures this second year were Christian Pietsis Escaping from Druid Persecution, by Holman Hunt; Christ in the House of his Parents, by Millais; Rossetti's picture of the Annunciation, he exhibited (as he had done with his picture of the previous year) at another exhibition than the Academy. Many journals were united in condemnation upon the three young artists, but undeniably the most damaging attack was one made by Charles Dickens in Household Words. From this date to his life's end Rossetti discontinued public exhibition. With this attack the bitter feeling against the young men so increased that in the following year (1851) one influential journal advocated that their pictures should be removed from the walls of the Royal Academy a few weeks after the opening of the exhibition. Thus, in the third year of its joint existence, the new school was threatened on all hands. The interest taken in the three artists appeared in the Times three letters from Ruskin denouncing the spirit of jealousy and injustice with which the young men had been assailed. He pointed out the merits of the works and the great influence for good which the revival was likely to exercise upon the English school. Later followed a succession of pictures from the hands of the three young painters, works the titles of which have become familiar throughout England.

Among the works of Holman Hunt are Rienzi (1849), Christian Pietsis Escaping from Druid Persecution (1850), Christian Pietsis and Isabella (1853), and Scapegrace (1856). Among Millais are The Infant Saviour (1850), and Christ in the Temple (1850). The infant Christ is always a subject dear to Millais. Among Rossetti are The Holy Innocents (1883), and Christ the Carpenter (1874). The Triumph of the Innocents (1885). Amongst those of J. E. Millais are Isabella (1849).
PRE-RAPHAELITISM

Although the present article bearing the author's name is "pay to some persons appear egotistical.—W. H. H."

PREROGATIVE

ROYAL. See Divine Right, Parliament, Sovereign, Pardon, Reprieve.

PREROGATIVE COURT. in England, was the court where all wills were proved and administrations taken out. It was so called because it belonged to the prerogative of the archbishop to take charge of these matters, which formerly fell under ecclesiastical supervision. Hence there was a Prerogative Court for the archdiocese of Canterbury and another for the province of York. This jurisdiction was entirely taken away in 1858 from the ecclesiastics, and transferred to a new court called the Probate Court (q.v.).

Presburg (Ger. Pressburg, Hung. Pozsony), a town of Hungary, stands on the left bank of the Danube, 40 miles by rail E. by S. of Vienna and close to the Danube. It is 120th December spurs of the Little Carpathians, and is a pleasant town. Its principal buildings are the cathedral, a Gothic edifice of the 13th century (restored in the middle of the 19th), in which the Kings of Hungary used to be crowned; the church of the Franciscans (1290-97); the houses of the early Romanesque; the history collection; the parliament house, in which the Hungarian representatives used to meet until 1848; and some private houses. The royal castle (1645) was destroyed by fire in 1811, and is now a ruin. There is an academy of jurisprudence and philosophy. The chief objects of manufacture are beer, dynamite, wire, starch, spirits, confectionery, biscuits, &c.; and there is considerable trade in corn, sheep, cattle, swine, and wine.

Presburg grew up to be a prominent town during the 11th and 12th centuries. It was long chosen for conferences and meetings between the rulers of Austria and Hungary. From 1541 (when the Turks seized Buda) down to 1754 it was the capital of Hungary. The town was taken by Bethlen Gabor in 1619, by the Austrians in 1621, and was bombarded by Davout in 1809. In November 1805 Napoleon concluded a treaty with the emperor after the battle of Austerlitz. Pop. (1881) 48,326; (1890) 52,444.

Presbyopia (Gr., 'old sight'), a change in the power of vision, not usually noticed till about forty-five years of age, when near objects come to be less distinctly seen than those at a distance. See Eye, Vol. IV, p. 512.

PRESBYTERIANISM

The name Presbyter is from the Greek presbyteros, 'elder.' The elders formed one division of the great council of the Jews, with the priests and scribes (Mark, xiv. 43); and every synagogue had its body of ruling elders (Luke, vii. 5, viii. 41). From these the name of some portion of the duties were transferred to the Christian church. We have no record of the first appointment of elders, but we find them as recognised rulers in the church of Jerusalem so early as the year 44 (Acts, xi. 30). The duties entrusted to them are these: (1) They had charge of the collections for the poor which were sent by the hands of Barnabas and Saul (Acts, xi. 30). (2) They are specially named as taking part in the council which was held at Jerusalem about the year 51 (Acts, xv. 2), and at the meeting of the church there when Paul reported on the tour with the Gentiles (Acts, xxi. 18). (3) They took part in the ordination of Timothy (1 Tim. iv. 14). (4) They were the pastors and bishops of the congregations. Thus the apostle Paul, addressing the elders of Ephesus, says, 'Take heed . . . to all the flock over which the Holy Ghost hath made you overseers (bishops) to feed the church of God' (Acts, xx. 28). And
writing to Timothy, he says, 'Let the elders that rule well be counted worthy of double honour, especially they which labour in word and doctrine' (1 Tim. v. 17). Elders also are found in all the churches. We have seen them in the mother-church of Jerusalem; and when Paul and Barnabas went forth on their first missionary journey, about the year 46, they ordained elders in every church (Acts, xiv. 22). Accordingly, in the year 75, we find them in the same city a few years later (1 Tim. v. 17, with chap. i. 3), and in Crete. Titus is commanded 'to ordain elders in every city' (Tit. i. 5). These are the scripture facts on which the system of Presbyterianism as a government by elders is based. Not only do we recognize the bishop as the superior of the presbyter, for they were originally two names of the same person. Thus in Titus, i. 5, 7, the apostle writes, 'Ordain elders in every city . . . for a bishop must be blameless,' and in Acts xx. those who in verse 17 are termed elders in verse 28 are termed bishops. On the original identity of the bishop and presbyter Bishop Lightfoot says, 'It is a fact now generally recognised by theologians of all shades of opinion, that in the language of the New Testament the same officer is called bishop, presbyter, elder, presbyter, presbyteros and presbyter.' There are two instances in which the term 'bishop' occurs apart from his being described as 'elder,' just as there are many examples of the elder being mentioned without his being termed bishop (Phil. i. 1; 1 Tim. iii. 2). In the writings of Clement of Rome, about the end of the 1st century, there is the same identity between the elder and the bishop; but from this period onwards the distinction between the two begins to appear, though Jerome in the 4th century writes: 'Among the ancients bishop and presbyter are used synonymously, but of dignity, the other of age.' See the articles BISHOP, CHURCH HISTORY, ORDERS (HOLY).

It is need to be ascertained that Presbyterianism survived in the ancient Celtic Church; but the Celtic polity, though differing widely from diocesan Episcopacy, was very unlike Presbyterianism (see IRELAND, p. 210; SCOTLAND, p. 242; COLUMBIA; CULDEES). The Waldenses (q.v.) were perhaps anti-episcopal. But Presbyterianism as we know it first ascertained itself at or after the Reformation, when earnest attempts were everywhere made to restore to the church the primitive life in Germany, France, and the Continent, from the relationship of church and state, its free development was prevented (see CONSISTORY). It was Calvin (q.v.) in Geneva who, though not its originator, gave Presbyterianism the form which, with modifications, it has ever since retained. It occupies a middle position between diocesan Episcopacy and Congregationalism, and may be styled ecclesiastical republicanism. The congregation elects its own minister and elders, and by deacons or managers regulates all its financial affairs. The session, consisting of the minister and chosen elders, has the oversight of the congregation. The ministers, with one or more elders from each congregation, constitute the presbytery (formerly sometimes called cæsaris) of a defined district, having a general superintendence of the congregations; to it appeal may be made from the congregations. Since the Reformation the churches still retain as part of the regular organisation the synod, consisting of a number of presbyteries in a province, and a court of appeal from presbyteries; other churches dispense with this intermediate court. The General Assembly or General Court is the highest form of the presbytery, and consists of all the presbyteries or their representatives.

Presbyterianism was for a short time dominant in England, but is now most fully represented in Scotland, the north of Ireland, the British Colonies, and the United States. The alliance of the Reformed Churches in the United States was founded at London in 1875, and has held 'Pan-presbyterian' councils at Edinburgh (1877), Philadelphia (1880), Belfast (1881), London (1888) Toronto (1892), Glasgow (1896), and Washington (1898). All churches are eligible 'having a creed in burhaviour which the confesions of the Reformed Confessions.' In 1896 there were 28 Presbyterian churches on the continent of Europe, 12 in the United Kingdom, 16 in North America, 7 in Australia, 2 in New Zealand, and 21 scattered over the rest of the world—80 in all, of which 67 were in the alliance. There were in all 25,564 Presbyterian church buildings, 25,477 ministers, and 4,527,140 communicants.

England.—The principles of the Puritans (q.v.) were essentially Presbyterian, although many of them were so much occupied with questions of doctrine and discipline, and with resistance to power exercised, as they believed, contrary to the word of God, that they paid little heed to the development of their principles in church government. Yet in 1572 a presbytery was formed at Wandsworth, in Surrey, by ministers of London and its suburbs, and other presbyteries were shortly formed. In England, and other presbyteries were soon formed, notwithstanding the extreme hostility of Queen Elizabeth. When the Westminster Assembly met in 1643 the Puritans of England were generally inclined to adopt Presbyterianism as their system of church government, although some still preferred a modified Episcopacy, and some had adopted the principles of Independency or Congregationalism. The Presbyterians were, however, the strongest party at the beginning of the Civil War, although the Independents gained the ascendency afterwards. The establishment of a Presbyterian form of government in the Church of England was voted by parliament (the Long Parliament), 13th October 1647; but it was never really established. The influence of the Independents prevented it. London and its neighbourhood were, meanwhile, formed into twelve presbyteries, constituting the Provincial Synod of London, which continued to hold regular half-yearly meetings till 1655, the meetings of presbyteries being continued till a later date; but the whole Presbyterian system was overturned by Cromwell's Committee of Triers, appointed for the purpose of bringing all dissenting and appositeness to any Ecclesiastical office. Cromwell's policy aimed at bringing all ecclesiastical matters under the immediate control of the civil power. The Restoration was followed by the fruitless Savoy Conference (q.v.), and soon after by the Act of Uniformity, which came into force on 24th August 1662; and on that day about 2000 ministers in England and Wales resigned their benefices, or submitted to be ejected from them, for conscience' sake. The first Nonconformists were mostly Presbyterians, but a small minority of Independents among them. The system of regular Presbyterian system, and the consequence was that the Nonconformists of England became in general practically Independent. Antinomianism and Arminianism soon appeared among them, and were followed by Socinianism or Unitarianism which, although such confessions of faith are not yet come synonymous in England with Socinian or Unitarian; old endowments, legacies of Presbyterians, being now in many instances enjoyed by Unitarians. Meanwhile, there sprang up in England a few congregations connected with the Church of Scotland, and in 1834 was formed the 'Secession Church,' now the United Presbyterian Church. The number of such afterwards very much increased. At the time of the formation
of the Free Church of Scotland (q.v.) the greater number of the English Presbyterian churches con-
ected with the Church of Scotland sympathised with the cause of the Free Church, and took the name of the Presbyterian Church in England. In 1876 a union, which had been long desired, was consummated between the synods more intimately related to the Free Church of Scotland and the congregations below the cause united in the name of the Presbyterian Church. The name assumed by the united church is the Presbyterian Church of England. At the time of the union the Presbyterian Church in England had about 150 churches, and the United Presbyterian Church more than 100. At the same date the Church of Scotland in England had about twenty congregations.

Scotland.—The Presbyterian Churches of Scot-
land are separately treated in the articles SCOT-
LAND (CHURCH HISTORY), FREE CHURCH OF
SCOTLAND, UNITED PRESBYTERIAN CHURCH, and
CAMERONIANS.

Ireland.—The Irish Presbyterian Church originated in the settlement of Ulster by Scottish coloni-
dists during the reign of James I. After various struggles a Presbyterian church was founded by the formation of a presbytery at Carrickfergus in 1689. The body rapidly grew, and greatly increased in number by immigration from Scotland about the middle of the 17th century; and, notwithstanding many difficulties, from the opposition of prelates and of the civil power, the church continued to grow. One very curious fact is that the Presbyterian ministers received a pension from government, under Charles II., in 1672, which Regium Donum (q.v.), however, was not regularly paid until the reign of William, when it was aug-
mented, although only to the paltry amount in all of £20. By William III. it was increased, and augmented, till it reached the amount of £70 for each minister. A seminary for the education of ministers was erected at Killaloe; and in 1710 the synod of the Presbyterian Church resolved to institute the preaching of the gospel to the Irish in their own language. During this period of its history the Irish Presbyterian Church experienced the utmost opposition from the High Church party. Afterward dissensions sprang up within it, and these with reference to the most important doc-
tines. A body opposed to the doctrine of the Westminster Confession of Faith was set up in the Presbytery of Antrim. But the doctrine of the Westminster Confession was more and more departed from in the Irish Presbyterian Church itself, which became to a large extent Arrian or Unitarian. In 1830 a separation took place from the Irish, who then formed the Remonstrant Presbytery of Ulster. In 1840 a union took place of the Irish Presbyterian Church forming the Synod of Ulster and the Secession Church in Ireland, an offshoot of the Scottish Secession Church, which then reckoned 141 congregations in the north of Ireland. The Irish Presbyterian Church, adhering to the Westminster Confession, in 1889 had 620 ministers, with 102,957 communicants (Presby-
terian pop. at 1891 census, 446,687), and it has not only displayed much zeal for the advance-
ment of the gospel, but has given itself also to the Christianization of other parts of the world, and supports a very successful mission in Gujarat and Manchuria. The act dis-establishing the Irish Church in 1869 provided also for the dis-
continuance of the Regium Donum. Presbyterian churches of annuities for life to ministers already entitled to it; and further gave power for commutation of annuities for a capital sum, of which advantage has been taken to a very large extent, so that a fund has been formed for paying annuities and leaving a large surplus as the

nucleus of a Sustentation Fund for the ministers in time to come. There are two colleges—one purely theological, at Belfast, with seven profes-
sors; the other, the Queen's College, with two professors and a complete curriculum. The colleges were empowered in 1881 jointly to grant degrees in theology.

United States.—The first Presbyterians in America were emigrants from Scotland and Ireland. The first Presbyterian congregations in America were organised in Maryland before the close of the 17th century—the oldest that of Rehoboth, dating about 1660—and the first presbytery in Philadelphia in 1765. A synod, consisting of four presbyteries, was constituted in 1716. Dissensions ceased; but in 1738 the American Presbyterian churches were united in one; and in 1788 a General Assembly was instituted, the whole number of congregations being then 419, and of ministers 188. The increase of the church was rapid, and in 1834 it contained 22 synods and presbyteries, and about 1900 ministers. In 1801 a scheme of union was adopted between Presbyterians and Congregationalists, under which hundreds of congregations were formed in the state of New York and elsewhere. About the beginning of the 19th century the Cumber-
land Presbyterian Church was reorganised. The number of ministers has been augmented, till it reached the amount of £70 for each minister. A seminary for the education of ministers was erected at Killaloe; and in 1710 the synod of the Presbyterian Church resolved to institute the preaching of the gospel to the Irish in their own language. During this period of its history the Irish Presbyterian Church experienced the utmost opposition from the High Church party. Afterward dissensions sprang up within it, and these with reference to the most important doctrines. A body opposed to the doctrine of the Westminster Confession of Faith was set up in the Presbytery of Antrim. But the doctrine of the Westminster Confession was more and more departed from in the Irish Presbyterian Church itself, which became to a large extent Arrian or Unitarian. In 1830 a separation took place from the Irish, who then formed the Remonstrant Presbytery of Ulster. In 1840 a union took place of the Irish Presbyterian Church forming the Synod of Ulster and the Secession Church in Ireland, an offshoot of the Scottish Secession Church, which then reckoned 141 congregations in the north of Ireland. The Irish Presbyterian Church, adhering to the Westminster Confession, in 1889 had 620 ministers, with 102,957 communicants (Presby-
terian pop. at 1891 census, 446,687), and it has not only displayed much zeal for the advance-
ment of the gospel, but has given itself also to the Christianization of other parts of the world, and supports a very successful mission in Gujarat and Manchuria. The act dis-establishing the Irish Church in 1869 provided also for the dis-
continuance of the Regium Donum. Presbyterian churches of annuities for life to ministers already entitled to it; and further gave power for commutation of annuities for a capital sum, of which advantage has been taken to a very large extent, so that a fund has been formed for paying annuities and leaving a large surplus as the

nucleus of a Sustentation Fund for the ministers in time to come. There are two colleges—one purely theological, at Belfast, with seven profes-
sors; the other, the Queen's College, with two professors and a complete curriculum. The colleges were empowered in 1881 jointly to grant degrees in theology.
The Plea of Presbytery (1840); Miller, Manual of Presbytery (1842); Smyth, Presbyter: the Scriptural Polity (1843); King, Church Government (1854); Macpherson, History and Constitution (1853), scribed, Worsdell, The History of the Presbytery (1854); Constitution and Law of the Church of Scotland (1884); Withrow, Form of the Christian Temple (1889); Killen, The Framers (1891); work of the Westminster Assembly and its Confession of Faith by Ithertington (new ed. 1891), Hodge (1890), Macpherson (1881), Mitchell (1867, 1883, 1886). See also the articles in this work on Cambridge, Scotland, York, (GENERAL), Church History, Return, Confessions, Westminster Assembly. For Presbyterians missions, see Missions. For Presbyterianism in England, see Madrie, Annuals of English Presbyterianism (1872); Drysdale, History of Presbyterians in England (1889); Minutes of the Manchester Presbyterian Classis (Chetham Society, part i—iii, 1899—91). For Ireland, see Ireland; also Reid, History of the Presbyterian Church in Ireland (1867); Irwin, Irish Presbyterianism (1890). For America, see Webster, History of the Presbyterian Churches in America (1857); Gillett, History of the Presbyterian Church in the United States (1864); American Presbyterian (1896).

Presbytery. For presbytery as a part of Presbyterian church government, see the preceding article. In ecclesiastical architecture the presbytery is the space in the choir of a church in which the high altar is placed; the name is sometimes extended to the whole choir.

Prescot, a manufacturing town of Lancashire, 8 miles E, by N. of Liverpool. It has manufactures (in Lancashire; 1788) of watches, clocks, small files, &c., and there are potteries near it. Prescot was the birthplace of John Kemple. Pop. (1851) 7393; (1891) 6453.

Prescott, a city of Arizona, lies in a picturesque mountain-valley, some 6000 feet above the sea-level, 157 miles by rail N.W. of Phoenix, the capital of the territory; mountains of from 7000 feet to 10,000 feet altitude nearly surround it. Gold and silver are found in the neighbourhood, and daily lines of the United States mail coaches connect it with the numerous mining camps round about. Besides bullion, it has a trade in lumber and wool. Pop. (1880) 1836; (1890) 5339.

Prescott, William Hickling, historian, was born at Heswall, Cheshire, Sept. 14, 1796. His father was a prosperous lawyer; his grandfather, Colonel William Prescott (1726—95), was a distinguished soldier in the Revolution, to whose memory a statue was erected on Banker Hill in 1811. He entered Harvard College in 1811, and graduated in 1814. Early in his college course he had his left eye blinded by a piece of bread playfully thrown by a fellow-student, and the other was soon sympathetically affected, so that he was obliged to live for months in a darkened room. He next travelled in England, France, and Italy, married in 1829, and abandoned the study of law for literature. He now devoted himself to severe study, and formed splendid literary projects, in spite of the grievous disadvantage of being able only to use his remaining eye for brief periods. His first studies were in Italian literature, and it was not till the beginning of 1826 that he had found the work of his life within the range of Spanish history. Fortunately his means were ample, so that he was able to procure the services of assistants, and to live amid conditions of comfort. By constant habit he gained the power of carrying a great amount of mental work, and he so revered the whole of a chapter in his mind he quickly transferred it to paper by means of his stylus and an ingenious writing-case specially constructed for the blind. His first secretary knew no Spanish, yet he went through the seven quarto volumes of Mariana's History, with him. So he laboured with almost unexampled courage and patience at his History of Ferdinand and Isabella (3 vols. Boston, 1838), which quickly carried his name across the ocean to the Old World, and was speedily reprinted in the way of French, Spanish, and German. He next devoted six years to the History of the Conquest of Mexico (3 vols. 1843), and four years to the Conquest of Peru (2 vols. 1847). These works deservedly brought him a great reputation; he was chosen a corresponding member of the French Institute, and on a visit to Europe in 1850 was received with the highest distinction. In 1855 he published two volumes of his History of Philip II., and a third volume in 1858, but died of apoplexy before its close at Boston, January 28, 1859. Prescott's style is at once more comprehensive and more finished than any he had hitherto employed, and to this day he remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day there remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrivalled among English historians for vigorous and direct narrative and for sustained splendour of colour. His imagination worked all the more freely because he saw but with the inward eye, and the splendid visions that it wove gave him a poetic fancy the charm of which to this day remains unrav
commence each prescription with the symbol B, which signifies *recipe* 'take.' As an illustration, we append a prescription for a tonic draught (where $f.$ stands for fluid ounce; $j.$ for fluid dram; $m.$ for minim; *gr.* for grain; M. for *missce, *mix*):

(Name of Patient.)

B. Quinua Sulph., gr. j.
Tinct. Calomel., f. j.
Acid. Sulph. Dilut., $m.$
Syrup. Aurant., f. j.
Infls. Calumbe, ad $f.$ j.
M. Fiat Haustus ter quotidie sumendas.

Date. (Initials or name of prescriber.)

As a parallel to this retention in western Europe of a medieval usage, it may be mentioned that in the pelmy days of the republic of Athens the Attic-speaking practitioner was held bound to write his prescriptions in the ancient Doric dialects; the reason in this case being that the schools of medicine in the Doric colonies of Magna Gracica and elsewhere were long the most celebrated.

**Prescription.** In Roman law, means a clause inserted in any bill or act, by which an (unliquidated) demand for an action was tried. The prescription *longi temporis* directed that the claimant should not succeed if the defendant had been so long in possession of the property in dispute that equity would not allow him to be disturbed. In England lapse of time may affect rights in various ways. The right of a claimant to bring an action may be taken away by statutes of limitation (q.v.), or the law may regard the long enjoyment of the possessor as evidence to show that his rights had a lawful origin. Possessory title to land is now gained under the extent of an estate, by the statute of limitation. In proving title by prescription to easements (such as rights of way, ancient lights, &c.) and other incorporeal rights over the land of another the claimant relies on immemorial enjoyment; but the courts would always infer the immemorial character of the right from a comparatively short period of actual enjoyment. And now, under the Prescription Act of 1832, the period is fixed at twenty years in the case of lights and other easements and thirty years in the case of other incorporeal rights (as common of pasture, and the like). For the rules of the act, see Shelford's *Real Property Statutes.*

In the law of Scotland prescription is a method both of acquiring and of losing a right; hence it is divided into positive and negative. The positive prescription of better title, *prescription of limitation,* is by the act of 1790, chap. 12. As that statute has been interpreted by decisions, possession of heritable subjects for forty years, on the requisite titles, recorded in the appropriate register, is sufficient to secure an owner against any one alleging a better title; or to determine the extent of an estate, where a question arises either as to what is comprehended under a general description or as to whether a specific piece of property has been carried under a clause of parts and pertinents; or to merge a title of property in the higher title of superiority. The possession must be uninterrupted and co-extensive with the right claimed. The Convocation Act, 1874 (37 and 38 Vict. chap. 94 sect. 34), simplified the title necessary for founding prescription, by enacting that 'any *ex facie* valid, irredeemable title, recorded in the appropriate register, shall be sufficient;' and shortened the prescriptive period by enacting that possession for twenty years continually and together, following on such recorded title, shall be equivalent to possession for the old period of forty years.

The negative prescription of obligations was first introduced by the Statute 1469, chap. 29, which declares that unless a person follow an obligation and take document thereon within forty years, his right shall prescribe and be of no avail. By the Act 1617, chap. 12, this prescription was extended to heritable bonds and other heritable rights, and it was enacted that the years of minority of the party against whom the prescription was used should not be counted. In addition to these long prescriptions there are several shorter prescriptions, whose object, generally speaking, is to protect third parties against the consequences of negligence in preserving vouchers and, after the expiration of the prescribed period, to enable them to bring actions and to take the benefit of pro bono and to restrict the mode of proof. Among these lesser prescriptions are the vicennial prescription of twenty years, applicable to returns and holograph writings; the ten years' or decennial prescription, applicable to actions against tutors and curators; the septennial prescription of cautionary obligations; the sexennial prescription of bills of exchange; the quinquennial prescription of arrears of rent in an agricultural lease, of ministers' stipends, of bargains concerning movables made verbally, and of inquisitions; the triennial prescription of the act of 1707, applying to cases of a barrister and solicitor's right to actions for servants' wages, for house-rents, or for accounts to attorneys, surgeons, agents, &c. In Scotland if, within twenty years after the commission of a crime, no step has been taken to bring the offender to justice, it would appear that the right to prosecute falls to the ground.

**Prescument.** See Criminal Law.

**Preserved Provisions.** Under the term *preserves* is usually included fruit, eaten whole or broken, or the juice of fruit, preserved by boiling with sugar, which is made in such a manner that the sugar penetrates the fruit completely. It is then drained and dried at a gentle heat, so that the absorbed sugar crystallises in the substance and on the surface of the fruit, which is then known as *jellied.* Jam consists of fruit boiled with an equal weight of sugar, which latter dissolves in the fruit juice set free as the fruit breaks down. If well made they can be preserved in this manner for years, but the quality deteriorates after twelve or eighteen months, owing to crystallisation and other changes taking place in the sugar. Fruit jellies consist of the juice of the fruit only, boiled with sugar, this vegetable jelly consisting principally of a substance known to chemists under the name of *pectin.* Fruits are also preserved by covering with water in suitable vessels, heating to a high temperature, and closing the vessel whilst hot.

Meat, vegetables, and other provisions may be preserved with more or less success in a number of ways, which may be classed roughly under four headings: (1) desiccation; (2) use of cold; (3) by chemical compounds (antiseptics); (4) by exclusion of air. The simple process of drying is effective both with meat and vegetables, and if completely carried out prevents the ordinary putrefactive changes from taking place. Dried vegetables are chopped large for use in cold ship's soup and soup tablets so extensively used nowadays consist of meat and vegetables dried and pressed together. Jerked Beef (q.v.) and Pemmican (q.v.) are prepared chiefly by drying in the sun. The use of cold is mainly a temporary expedient employed for the carriage of meat from one country to another. This industry is carried on extensively in America, Australia, and New Zealand. The case is frozen hard by a refrigerating machine, and packed on board ship in a chamber cooled by a similar apparatus. Meat so transported in Europe in good condition, and if properly thawed is superior to all but the best home-grown beef
and mutton (see Refrigeration). For condensed milk, see Milk.

Certain chemical substances have the power to prevent decay or arrest putrefactive changes, by destroying the activity of the germs or fermenters which cause putrefaction, and these have been variously applied for the purpose of preserving meat (the food-value being thereby somewhat decreased); the meat may be immersed in brine, packed in salt, rubbed with salt and dried, or salted and smoked. The method of salting and smoking a ham is described at HAM; the chief preservative element in the wood-smoke is cresote. Cresote, boracic acid, salicylic acid, and sulphur compounds are all substances that can be used as food preservatives, but the objection to the use of chemical agents is that they either have a distinct taste themselves or have a toxic influence on the human body. Salicylic acid has been used in large quantities for preserving milk and other foods, but, when taken even in small doses for a lengthened period, it disturbs the animal economy; and in France any food preserved by its means is marked as such to prevent its use. The use of cresote is confined to meats which are usually smoked. Boracic acid has no taste, and in all probability is harmless when taken in the small quantities present in food preserved by its means. Milk, fish, poultry, and most of all kinds may be preserved with it. A very ingenious method of using this preservative has been tried with success. The boracic acid is injected into the large vein of an insensible but living animal, so that it is carried in the ordinary circulation to all parts of the body, and the animal dies in a state so prepared that it has become fresh and paintable for about three months. Some sulphur compounds, notably the bisulphite of lime and sulphurous acid, are good preservatives, but they have an objectionable taste. The former is used by butchers as a preserver of meat in hot weather.

Exclusion of air is a method of preserving which is used almost exclusively for cooked foods. Various plans of coating meat with air-tight coating have been tried, but they have been carried little further than the experimental stage. More efficient has been a plan of preserving meat in tins, gutta-percha, &c.—all of which exclude air; but the air, or, more correctly, the germs present in the air, are imprisoned in the tissues of the meat, and these specifically set up putrefactive changes. The only method sufficiently effective to accomplish the desired end is by the use of high temperature to expel the air and destroy the germs, and then sealing to prevent ingress of more air. Many have claimed the credit of this invention, but in all probability it was first proposed by a M. Appert of Paris in 1810. The process now carried on, however, is the outcome of many minds. Appert's original method simply supplying the groundwork. The various tinned meats, soups, &c., now in the market are examples of this method of preserving food. The meat, &c., is placed in tins, which are immersed in a solution of calcium chloride heated up to a temperature of 270° F., which destroys both germs and spores. The tins are previously closed, except a small pin-hole for the escape of steam. They are heated thus for about three hours, when the pin-holes are closed with solder, and the tins allowed to cool. This process is thoroughly successful as far as the prevention of putrefaction goes. Tins of meat thus treated have been opened after twenty years, and no sign of putrefaction has been noted; occasionally through some carelessness the air may not have been thoroughly removed, and putrefactive changes; such exceptions, however, are rarely met with in this sort of process. Good firms. A bad tin can be detected before opening by the bulged-out appearance of the tin, the gasses of decomposition pressing out the sides or ends. The objection to the process lies in the water-cooking to which the meat must be subjected. This impairs its nutritive value, and the high temperature no doubt removes some of the nutritive value of the meat, although this latter point is denied by some. Other plans, varying somewhat in detail but similar in principle, have been patented, and are in use in some of the food-preserving factories. Aberdeen and London are large for this industry, the former having five factories, whilst in America and New Zealand (q.v.) a large amount of capital is invested in the trade. See Salmon.

The various extracts of meat are in a way preserved foods. They consist of the juices and extractive matter of the meat evaporated down to a thick consistence, and frequently preserved by a large addition of salt. The majority of these extracts are stimulants rather than foods, some of them being practically useless. Vegetables are frequently preserved by the process of pickling. The vegetable being treated similarly to meat, and the latter two substances, being antiseptic in their nature, prevent putrefaction and decay. For the preservation of wood, see DRY ROT.

Presidency. See India.

President of the United States, the head of the executive of the United States, is also the only executive officer who reaches his position by election; the appointment of the others being either in his hands (subject to their confirmation by the Senate) or regulated by law. The president is elected for a term of four years; eight presidents—Washington, Jefferson, Madison, Monroe, Jackson, Lincoln, Grant, and Cleveland—have been chosen for a second term, but a third term, although there is nothing in the constitution to prevent it, is practically impossible, by the clause in the constitution against it. A candidate must be a natural-born citizen of the United States, not under thirty-five years of age. The president has a salary of $50,000 a year, and must receive no other emolument during office from the United States or any state. He is elected by the people of the United States, and of the militia when in the actual service of the Union; he has the power to grant reprieves and pardons for offences against the United States, except in cases of impeachment, and (by and with the advice and consent of the Senate) to appoint ambassadors, consuls, and all other officers of the United States whose appointments are not otherwise provided for; from time to time he sends to Congress a 'message' (cf. the 'Queen's Speech') giving information as to the state of the Union, and recommending measures for consideration; he may convene both houses, or either house, in special session; and, if the two houses disagree as to the time of adjournment, he may adjourn them to such time as he thinks fit. The president, like the vice-president and all other civil officers, may be removed from office on impeachment by the House of Representatives for and on conviction by two-thirds of the Senate of treason, bribery, or other high crimes and misdemeanours. He may require the opinion, in writing, of the head of any of the executive departments on any subject relating to the duties of his department. The president possesses the power of convening the President's signature to become a law, unless, after he has returned it with his objections, two-thirds of each house support it and pass it over his veto.

The Vice-president of the United States, although elected along with the president, is not part of the executive department. His sole function in to
PRESIDENT

PRESIDIO, a Spanish word for 'a fort,' applied especially to four Spanish fortified posts on the coast of Mexico—Centa, Melilla, Almeenas, and Poison de Ysa.

Press, Freedom of the, the expression used to denote the absence of any official restraint on the publication of books and other printed matter. In England, at the Reformation, the control of the press came to be centred in the crown, the ecclesiastical in addition to the secular government being vested in the hands of the Vicar and Chapter of the church. The Company of Stationers, who came to have the regulation of printing and publishing, were servants of the government, subject to the control of the Star Chamber. The censorship of the press was enforced by the Lord Parliament, in spite of Milton's eloquent protest (see his Areopagitica), and was re-established more rigorously at the Restoration. It was continued at the Revolution, and the statute regulating it was renewed from time to time till 1663, when the Commons by a special vote struck it out of the list of temporary acts to be continued. Since that time the censorship of the press has ceased to exist in Britain. But, though there are no official restrictions on what shall and what shall not be published, the authors and publishers of criminal or injurious matter are subject to the classes of rule; and there are certain statutory requirements in force to enable them to be traced. Every person who prints anything for hire or reward must, under a penalty of £20, keep one copy at least of the matter printed, and write on it the name and place of abode of the person who employed him to print it. Every person who prints any paper meant to be published must print on the first or last leaf his name and usual place of business; and on failure to do so he forfeits the sum of £5, and so does any person publishing the same. There are a few printed papers governed by the above requirement—as, for instance, papers printed by parliament or in government offices, engravings, auction lists, bank-notes, bills of lading, receipts for money, and a few other similar matters. In the case of a libel legal publication is constitutive of the action, and every copy printed or in manuscript to any person; the sale of a newspaper or other publication in a shop, or its delivery to an officer at the Stamp-office, is also considered an act of publication. The truth of the statement published is, however, no plea of defence in an action for libel; in criminal proceedings truth is a defence if the publication is for the public benefit. The publisher of a book or newspaper may also defend himself by showing that the matter complained of was published by order of either House of Parliament, that it is a fair criticism on a public person or act, or that it represents the honest belief of the defendant, and is published by him in the course of his official or moral duty. If a bill shall be filed in any court for the discovery of the name of the printer, publisher, or publisher of a newspaper, or of any other publication, with the view of rendering him liable in damages for slanderous matter, the defendant is bound to make the discovery required, which, however, cannot be made use of against him in any other proceedings, or of any proceeding that he may make. The penalties against newspapers can only be sued for in the name of the Attorney-general or Solicitor-general, or Lord Advocate. Certain regulations also exist regarding the exhibition of plays (q.v.). Subject to these restrictions, the freedom of the press has subsisted in Britain at least since 1693. At least an equal degree of freedom obtains in the United States, where privilege is much more widely extended. See Libel.

A more or less rigorous censorship of the press
exists in most European states. There is often no direct supervision previous to publication, but the official censor has it in his power to stop any publication which he deems objectionable, to confiscate the edition, and to prosecute the author and editor. Newspapers and pamphlets are generally subjected to a stricter censorship than larger works. See J. Lynd, Olders on Libel, and Paterson on the Liberty of the Press.—For Correction of the Press, see PROOFS.

Pressénsé, EDMOND DE, a prominent French Protestant theologian, was born in Paris, January 24, 1824, studied at the university there, next under Vinet at Lausanne, and Tholuck and Neander at Halle and Berlin; and in 1847 became a pastor at Paris. He was deputy to the National Assembly for the Seine department in 1871-76, and was elected a senator for life in 1883. He received the D.D. degree from Breslau in 1869 and Edinburgh in 1884. He died April 8, 1891. A strong thinker and vigorous writer, as well as an eloquent演说家, Pressénsé took a foremost part in the great theological as well as ecclesiastical controversies of the day; published many learned and important books, most of which have been translated into English and German; and contributed to the leading French theological magazines on both sides of the Channel—the article on Christianity in the present work is from his pen.

The following are the most important books: Le Rédempteur (1854; Eng. trans. 1864); Histoire des Trois Premières Sibylles de l'Eglise Chrétienne (4 vols. 1858-57; Eng. trans. 1860-63); Le livre de Jésus Chrétien (1869; Eng. trans. 1872); La Conception du Christ (1880; Eng. trans. New York, 1880); and Les Origines (1882; Eng. trans. 1883).

Pressgang. Impression was the mode formerly resorted to for manning the British navy. The practice had not only the sanction of custom, but the force of law. It may be traced in English legislation from the days of Edward I. and many acts of parliament, from the reign of Philip and Mary to that of George III., were passed to regulate the system of impressment. Impression consisted in seizing by force, for service in the royal navy, seamen, river-watermen, and at times landmen, when they were engaged in earning their livelihood. The pressgang, an armed party of reliable men commanded by officers, usually proceeded to such seaports in the seaport towns as were supposed to be the resort of the seafaring population, laid violent hands on all eligible men, and conveyed them forcibly to the ships of war in the harbour. As it was not in the nature of sailors to yield without a struggle many terrible fights took place between the pressgang and their intended victims—combats in which lives were often lost. In point of justice there is little, if anything, to be said for impressment; it had not the merit of an impartial selection from the whole available population. Under the laws all eligible men of seafaring habits were liable between the ages of eighteen and fifty-five; but exemptions were made in favour of apprentices, seamen and mariners, fishermen at sea, a proportion of able seamen in each collier, bargemen in wharves, and a few others. A pressgang could board a merchant-vessel or a privateer of its own nation in any part of the world, and carry off as many of the best men as it pleased without letters of marque or licence, or any notice of seamen in the vessel. The exercise of this power made a privateer dread a friendly man-of-war more than an enemy, and often led to an exciting a chase when enemies were in pursuit of each other; for the privateer's men were the best sailors, for their purpose, that the naval officers could lay hold on. Mitigations of the harsh laws on the subject were frequently introduced. As early as 1563 the naval authorities had to secure the sanction of the local justices of peace; in 1585 the term of an impressed man's service was limited to five years save in urgent cases. By the navigation laws, the system became obsolete; the navy was manured by voluntary service. In recent times, when volunteers fail, a system of bounty has been resorted to. But the laws sanctioning impressment slumber, without being repealed.

Pressing to Death. See Peine Forte et Dure.

Prester John, the name applied by medieval credulity for two hundred years to the supposed Christian sovereign of a vast but ill-defined empire in central Asia. The idea of a powerful Christian potentate in the far East, at once wise and just, was universal in Europe from about the middle of the 12th to the beginning of the 14th century, when it was transferred to Ethiopia and finally found a fancied historical justification in identification with the Christian king of Abyssinia.

The conception of a Prester John, sprung from the ancient race of the Magi of the Gospels, occurs in the Chronicle of Otto, bishop of Freisingen. Here, on the authority (1145) of the bishop of Gubala (Jiblal in Syrian), we find a circumstantial account of his power, his Christianity after the Nestorian pattern, his victories over the Medes and Persians, and how his progress to Jerusalem was stayed by the intervening Tigris, which refused to give over to him passage. Again, about 1165, there was widely current in Europe an extravagant romance supposed to be addressed by Prester John to the Greek emperor Manuel. Here we read astounding wonders enough: how that he ruled over the three Indies and countless hordes of men, among them those unclean races which Alexander the Great shut up within the northern mountains; that thirteen great elephants, gold and jewels were borne before as many armies, each of 10,000 knights and 100,000 foot; that all his subjects were virtuous and happy; attendant upon him were seven kings, sixty dukes, and 365 counts, twelve archbishops, and twenty bishops, while seventy-two kings with their kingdoms were his tributaries; that before he left his house he saw everything that was happening in all his vast dominions; his kingdom contained the Fountains of Yonuth, the Sea of Sand, the River of Stones, and the river whose sand was precious gems, ants that dig gold, fish that yielded purplish pebbles that give light and make invisible, and the salamander which lives in fire, from the inc postponable covering of which were fashioned robes for the presbyter to wear. There is also extant a letter of date 1177, written by Pope Alexander III., and addressed not to the imaginary author of the grandiloquent epistle of 1165.

About the year 1221 the distant rumour of the conquests of Ghenghis Khan again gave strength to the belief in such a mighty Christian potentate. M. d'Avezin first pointed out the true historical source of the Prester John romances in the Yolien Toshi, founder of the empire of Kure-Khati, who assumed the title of Gur Khan (supposed by Oppert to have been confounded with Yakkanan or Johannnes), and fixed his capital at Balasaghun, north of the Tian Shan range. He defeated Sanjar the Seljuk and overran the Uighurs; he finally entered and plundered the Song and Tungarkand, but, though hostile to the Moslem historians, of course never made any profession of Christian faith. Professor Brun of Odessa identifies Prester John with the 12th-century Georgian prince John Orbelian, a redoubtable enemy of the Turks.
Preston

an important manufacturing town of Lancashire, a municipal, parliamentary, and county borough, about 3 miles S. of Manchester, and 209 NNW. of London. Occupying an elevation 120 feet above the river, and built mostly of brick, it is on the whole well laid out, and is surrounded with pleasant scenery.

The town was built on a plan of 1802–07 from designs by Sir G. G. Scott at a cost of £80,000, is a French Gothic pile, with a clock-tower and spire 193 feet high. In September 1822 were laid the foundation-stones both of the Lancashire county hall and of the Harris free library and museum, latter of which was opened 1854. M. R. Newbush bequeathed a collection of pictures and art-treasures worth £70,000. The places of worship are all of them modern, for even the parish church has been rebuilt.

St. Walburges (Ionian Catholic), by Hansom (in 1811) has an arc of 305 feet high, the loftiest built in England since the Reformation, which amply redeems 'prond Preston' from its old 'no-steeple' reproach. Other edifices are the grammar-school (1590; rebuilt 1841), the corn exchange and market-house (1824), public library and museum, covered market (1876), militia barracks (1856), the infirmary (1859), &c. Three large public parks were laid out in 1867—the Miller and Avenham parks, and the former insightly 'Moor' of 100 acres to the north of the town. In the first a statue was erected in 1873 of the fourteenth Earl of Derby; in Winckley Square is a monument to Sir Robert Peel. Preston was constituted an independent port in 1843; and great improvements have been effected at a cost of three-quarters of a million under the 'Ribble Navigation and Preston Dock Act, 1883,' these including the deepening of the channel so as to admit vessels of 1000 tons, the construction of a dock of 40 acres, the erection of warehouses, &c. Arkwright (q.v.), who was born here in 1732, in 1768 set up here his famous spinning-frame; and Preston now is one of the principal seats of the cotton industry, which greatly assisted the linen manufacture, its staple in the 18th century. There are also iron and brass foundries, iron ship-building yards, engineering and machine shops, steam-boiler works, rope-walks, &c. A guild-merchant festival, first clearly held in 1597, has been held regularly every twenty years since 1562—last the 4th September 1882. Preston, the first of whose royal charters was granted by Henry VI., returns two members to parliament. The borough boundary was extended in 1883.

Preston arose whilst ancient Cocceum or Ribchester, higher up the Ribble, decayed. In Athelstan's reign Amounderness, the hundred in which it is situated, was granted to the cathedral church of York; hence its chief town came to be known as Preston or 'priests' town.' Near Preston, on 17th August 1648, Cromwell totally routed the royalists under Sir Marmaduke Langdale; and Preston figures in both the Jacobeans' rebellions of 1715 and 1745. For Forster's little army surrendered here to General Willes; and Prince Charles Edward occupied the town on both his march to and his retreat from Derby. Lady Hamilton has been claimed, but falsely it seems, as a native of Preston.

Livesey of Preston and six others here signed a pledge of total abstinence—the first ever taken in England.

See works by Whittle (2 vols. 1821–27), Dobson (four, 1856–62), Hardwick (1867), Abram (1892), and T. C. Smith (1893).

Prestonpans, a coast-town of Haddingtonshire, 8 miles E. of Edinburgh. Its salt-pans flourished from the 12th century till 1825; now brewing and fishing are the principal industries. Pop. 2623.

To the south-east, on 21st September 1745, was fought the battle of Prestonpans, Preston, or Gladsmuir, when in a five minutes' rush Prince Charles Edward's 2500 Highlanders completely routed 2390 disciplined soldiers under Sir John Cope and Colonel Gardner (q.v.).

Prestwick, a cotton manufacturing town of Lanarkshire, 4 miles N.NW. of Manchester, with a 136th century Gothic church. Pop. (1901) 7800.

Prestwick, Sir Joseph (1812–90), was a London wine-merchant, and in 1874 became professor of Geology at Oxford, and in 1896 was knighted. See the Life by his wife (1899).

Prestwick, the headquarters of golf on the Ayrshire coast, 2½ miles N. of Ayr; pop. 2000.

Presumption, an inference drawn by the law in certain circumstances, and used to start an argument. A person who has possession of goods is presumed to be the owner till the contrary is proved. A man is presumed to be innocent till the contrary is proved. The law of England presumes that any one who has not been heard of for seven years is dead. By an act of 1881 for Scotland the heir of a person who has disappeared for seven years may obtain authority to uplift the annual income, and thirteen years later may obtain full possession of the inheritable estate of the person presumed to be dead; for securing full right to inherit and dispose of movable estate, the person must be dead for fourteen years.

Pretender. See Jacobites, Stewart.

Pretoria, the capital of the South African Republic (Transvaal), 880 miles by rail (1893) from Cape-town and 205 miles W. of Johannesburg, on Delagoa Bay, to which a railway was opened in 1895. Pretoria was founded in 1855 by the Boer leader Pretorius, has broad streets, and pure water. It owes its prosperity chiefly to the gold-mines at Johannesburg, about 20 miles distant. New public buildings were erected in 1891. Pop. 8000.

Preventive Officers. See Coastguard.

Preveza, or Preveza, a fortified town in the extreme south-west of European Turkey, stands on the north side of the entrance to the Gulf of Arta. It exports valonia acorns, wool, cotton, and oil. The Venetians held the town from 1603 to 1707. One year later Ali Pasha drove out the French garrison and plundered the place.

Prévost. Abbé. Antoine François Prévost, d'Exilles, commonly called the Abbé Prévost, and
immortal as the author of Manon Lescaut, was born of good family at Hesdin in Artois, 1st April 1697. He was educated by the Jesuits at Hesdin, and at the Collège d'Harcourt in Paris, at sixteen volunteered for service as the last war of Louis XIV. was coming to an end. He spent the next six years in a round of religious duties, in study, and in writing a volume of Gallicia Christiana. About the year 1727, being anxious to be transferred to Cluny, where the rule was less austere, he desisted his permission, and so found himself unexpectedly guilty of the sin of disobedience. He fled to Holland, and spent six years of exile in that country and in England, and there is even a dim story of a love entanglement against which he strove for a while in vain. In 1728 he published the first and best of his long novels, the Mémoires d'un homme de lettres, the narrative of which Lescaut (apparently first published at Amsterdam in 1733) forms a kind of supplement. His fluent pen employed itself in further novels—Cleveland, fils naturel de Crowwel; Le Poêy de Kilkerine—in translations, and in Le Pour et Contre (1735-40), adefence of his life and ideals in the world of the Spectator, and showing an excellent appreciation of English books. By 1735 he was back in France by royal permission, and allowed to wear the dress of the secular priesthood. He was befriended by Cardinal de Bissy, and the Prince de Conti, whose chaplain he became, and for thirty years he wrote assiduously over a hundred volumes of compilations, including a voluminous Histoire générale des Voyages (of which vol. i, 1746, contains a fine portrait by Schmidt), histories, moral essays, translations of Pamela and Clarissa Harlowe, and at least one novel—Histoire d'une Grecque Moderne. In 1741 a literary service thoughtlessly rendered to a satirical novelist drove him from France to Brussels, thence to Frankfort; but he was soon forgiven by M. de Maurepas, and allowed to return. He lived in Brussels in subsequent quantity, walked much in the woods there, and died in the rupture of an aneurism, 23d November 1763. The story of long duration that was after he thought to have died of apoplexy, a stupid surgeon, in haste to begin a post-mortem examination, both brought him back to life. Lescaut killed him with a single thrust of his knife; but this time, the romance first appeared about 1782, and was completely disproved by Harrisso (see his L'Abbé Prévost, 1866). Many other legends have clustered round Prévost's romantic life. Of these the most remarkable is a practically baseless calumny that he killed his own father, who had chid him in an intrigue, by throwing him downstairs.

Prévost's is one of the names lifted securely above the flood of time by one book written in a moment of happy inspiration. Manon Lescaut remains drawing to its clustering, and personal, from its perfect and unaffected simplicity, the stamp of reality and truth throughout, and a style so flowing, easy, and natural, that the reader forgets it altogether in the overpowering pathetic interest of the story. The half-dozen figures portrayed have the life of themselves: the young Chevalier de Grieux, the hero, is a lover of the most transparent, absolutely forgetful of self, and idealizing even the unworthiness of his mistress: Tiberge is an admirable type of the sensible and faithful friend, Lescaut, Macon's brother, of the mufian and bully; but the triumph of the book is Manon herself, charming, light-hearted, shallow, incapable of a love that she will not sacrifice for luxury, yet ever moved with a real affection for her lover, constant even in her inconsistency and her degradation, the goodness ever shining through the guilt, and at last purified by love and suffering. One feels in this union of the heroic and the human, a moment when reality ends and fiction begins, and indeed it remains to this day unequaled as a truthful realisation of one over-mastering passion. From beginning to end a careful reader detects the traces of a real experience, for its author had himself a sensitive heart and a weak and vacillating character. Both a Tiberge and a Des Grieux met in himself, for his character and ideas were pure and elevated, despite the weaknesses that grew out of his passionate and impulsive soul. Compounded, like his hero, at once of weakness and of strength, he is not to be regarded with admiration so much as sympathy and affection, for, if his sensitive and impressionable heart opened a door to frailties ill-befitting the habit that he wore, these frailties at least were natural and not disdained, and did not corrupt his heart any more than their possessor. Anon was to have written:

There is no complete edition of Prévost's works. His Œuvres Classiques were collected at Amsterdam (39 vols. 1783-85). Of his one masterpiece the editions are numberless, and there is at least one fair English translation, by L. E. de Custis (1841); the biography prefixed to Prévost's Pensées (1764), and Sainte-Beuve in Portraits Littéraires, vols. i. and iii., and Études du Lundi, vol. ix.

Prévost-Paradol, Lucien Anatole, French journalist, was born at Paris, son of an actress, 8th August 1820, passed with distinction through the Collège Bourbon and École Normale, and became in 1855 professor of French literature at Aix. Hardly a year later he was at work in Paris on the Journal des Débats and Courrier du Dauphine, and from time to time he published collections of essays on literature and politics, of which the best is his Essais sur les Moralistes Français (1864). In 1865 he was elected to the Academy, and in 1868 he visited England, and was honored at Edinburgh with a public entertainment. He had always been a moderate Liberal, an opponent of the empire, but the accessions made upon him by power in January 1870 seemed to open up a new era for French policy, and he allowed himself to accept the post of envoy to the United States. Sensely was he installed when the war with Germany broke out, and the Prévost-Paradol, his mind unhinged by the virulent attacks made upon him by the republican press, and hopeless of the issue of the struggle before his country, solved his own difficulties by suicide at Washington, 20th July 1870.

Pray, Birds of. See BIRDS OF PRAY.

PriaM, king of Troy at the time of the Trojan war, was the son of Laomedon and Strymo or Phaeac. The name means 'the ransomed,' and was given him on account of his having been ransomed by his sister Hesione from Hecules, into whose hands he had fallen. His first wife was Arisha, daughter of Merops, whom he gave away to a friend in order to marry Helenia, by whom, according to Homer, he had nineteen sons. He had altogether fifty sons: later writers add as many daughters. The best known of these are Hector, Paris, Deiphobus, Helemus, Troilus, and Cassandra. Priam is represented as too old to take any active part in the Trojan war, and in Homer only once appears on the field of battle. After Hector's death he went to the tent of Achilles to beg the body for burial. The oldest Greek legends are silent respecting his fate; but later poets like Euripides and Virgil say that he was slain by Pyrrhus when the Greeks stormed the city.
Priapus, son of Dionysus and Aphrodite, born at Lampsaus on the Hellespont, considered as a divinity of fruitfulness, especially of flocks of sheep and goats, of bees, the vine, and of all kinds of garden produce. His statues usually stood in gardens, in the form of rude wooden images, painted vermilion, with a club, sickle, and phallic symbol of exaggerated dimensions.

Pribram, a mining town of Bohemia, 48 miles by rail SSW. of Prague, employs 6000 men in the royal lead and silver mines, and various manufactories. There is a medical academy, and a hospital, which is much frequented by pilgrims. Pop. (1890) 13,412.

Pribylvod Islands. See Alaska.

Price, Richard, philosopher, was born at Tyn-ton, in Glamorganshire, on 22d February 1723. His father was a dissenting minister, morose, bigoted, and intolerant, in complete antithesis to the disposition of the son. As a boy he read Clarke and Butler, went at eighteen to a dissenting academy, and in London, and at the close of his studies became chaplain to a Mr STreetfald at Stoke-Newington, with whom he lived for thirteen years. Legacies from his patron and an uncle in 1756 enabled him to marry. He behavoured as a preacher at Newington Green and at Hackney, and established a reputation by his somewhat heavy but able Review of the Principal Questions in Morals (1758). His apologetic work, On the Importance of Christianity, appeared in 1766. In 1769 he received from Glasgow the degree of Doctor, and published his Treatise on Reversionary Payments; which was followed by the compilation of the celebrated Northampton Mortality Tables, and various other works of value relating to life assurance and annuities. In 1771 appeared his famous Appeal to the Public on the Hoard of the Nation. Debt; in 1776 his Observations on Civil Liberty and the Justice and Policy of the War with America. The latter brought him the freedom of the city of London and an invitation from congress to assist in regulating its finances. Price lived long enough to herald the promise of the French Revolution, and to be denounced in Burke's Reflections. He died April 19, 1791. Price was a believer in the immateriality of the soul, holding that it remained in a dormant state between death and resurrection. The subscription on this question degenerated to a controversy of some celebrity between him and his friend Dr Priestley. His views respecting the divinity of Christ were what is called Low or semi-Arian. As a moralist he has a close affinity with Culwirth, and in some points strangely fore-shadowed the greater name of Kant. Of his great treatise on morals the chief positions are these: actions are in themselves right or wrong; right and wrong are simple ideas incapable of analysis; these ideas are received immediately by the intuitive power of the reason or understanding. See the Life by his nephew, William Morgan (1814).

Price, Thomas (1727-1848), a distinguished Welsh scholar. See WALES (LANGUAGE AND LITERATURE).

Pritchard, James Cowles, ethnologist, was born at Ross in Herefordshire, 11th February 1766. The son of a Quaker merchant, he received a careful education in schools and in Bristol, where he had many chances of picking up foreign languages. There, at St Thomas's, London, and in Edinburgh he studied medicine; and in 1810, after a residence both at Cambridge and at Oxford, he commenced practice in Bristol as a physician. His talents were soon recognised, and in 1816 he was appointed physician first to the Clifton dispensary and St Peter's Hospital, and afterwards to the Bristol infirmary. In 1813 appeared his Researches into the Physical History of Mankind, which, at once secured him a high standing as an ethnologist. The different editions of this work (4th, 5 vols. 1841-51) gave further proofs of the zeal with which he pursued his ethnological inquiries; and at the same time he devoted himself much to philosophy, to which he rightly judged to be absolutely indispensable for an enlarged study of ethnology. He made himself master not only of the Romance, Teutonic, and Celtic languages, but also of Sanskrit, Hebrew, Arabic, and in The Eastern Origins of the Celtic Nations (1831; 2d ed. by Latham, 1857) he compared the different dialects of Celtic with the Sanskrit, Greek, Latin, and Teutonic languages, and succeeded in establishing a close affinity between them all, from which he argued in favour of a common origin for all the peoples speaking those languages. Besides several medical works, he also published an Analysis of Egyptian Mythology (1819; Ger. trans. by A. W. von Schlegel, 1837) and The Natural History of Man (2 vols. 1843; 4th ed. by E. Norris, 1853). As a tribute to his eminence as an ethnologist, Dr Pritchard was elected president of the Ethnological Society; while in recognition of his researches into the nature and various forms of insanity he was appointed in 1845 a commissioner in lunacy. This occasioned his removal to London, where on 22d December 1846 he died of consumption at the age of 79. The first to raise ethnology to the rank of a science, he was himself a monogenist, maintaining that man is one in species, and that the negro is the primitive type of the human race.

Prickly Pear, or Indian Fig (Opuntia), a genus of plants of the natural order Cactaceae (q.v.), having many stem usually compressed articulations; leafless, except that the youngest shoots produce small cylindrical leaves which soon fall off; generally covered with clusters of strong hairs or of prickles; the flowers springing from among the clusters of prickles, or from the margin or summit of the articulations, solitary, or corymbose-paniculate, generally yellow, rarely white or red; the fruit resembling a fig or pear, with clusters of prickles on the skin, mucilaginous, generally edible—that of some species pleasant, that of others poisonous. The prickles are so strong, and their stems grow up in such number and strength, that they are used for hedges in warm countries. The Common Prickly Pear or Indian Fig (O. vulgaris), a native of Virginia and more southern parts of North America, is now naturalised in many countries of Europe and north of Africa, and in other warm countries. It grows well on the barest rocks, and spreads over expanses of volcanic sand and ashes too arid for almost any other plant. It is of humble growth; its fruit oval, rather larger than a hen's egg, white, or yellow and red, the pulp red or purple, juicy, and pleasantly combining sweetness with acidity. It is extensively used in many countries as an article of food. In the south of England the prickly pear lives
in the open air, and occasionally ripens its fruit. In species it is cultivated considerably to the north of its native region. Lime publish is often mixed with the soil in which it is to be planted. The fruit is imported into Britain, to a small extent, from the Mediterranean. The Dwarf Prickly Pear (O. nana), very similar, but smaller, and more prostrate in stem, is naturalised in Europe as far north as the sunny slopes of the Tyrol. The Tuna (O. tuna), much used in some parts of the West Indies as a hedge-plant, and also valuable as one of the species which afford food to the cochineal insect, yields a pleasant fruit. It has red flowers, with light stamens, which display a remarkable irritability.

Pride, Thomas, one of the most resolute of Cromwell's soldiers, was a native of London, and of humble origin. At first a drayman and brewer, he enlisted at the commencement of the Civil War, and by his merit quickly rose to be colonel. He commanded a brigade under Cromwell in Scotland, and, when the House of Commons betrayed a disposition to effect a settlement with the king, was appointed by the army to purge it of its Presbyterian royalist members. By 'Pride's Purge' about a hundred were excluded, whereupon the House was reduced to about eighty members, proceeded to bring the king to justice. Colonel Pride sat among his judges, and signed the death-warrant. He died 23 Oct. 1658, and so felt the rage of his enemies when his body was dug up and hanged beside Cromwell's on Tyburn.

Prideaux, Humphrey, scholar and divine, was born of an ancient and honourable family at Padrów, Cornwall, 21 May 1648. He was educated at Westminster School under Dr Busby, and then at Christ Church, Oxford, where he graduated B.A. in 1672. His Marmora Oceanitae (1676), an account of the Arundel Marbles, procured for him the friendship of Lord Chancellor Finch (afterwards Earl of Nottingham), who in 1679 appointed him rector of St Clement's, Oxford, and in 1681 a prebendary of Norwich. After several minor preferments he was collated in 1688 to the archdeaconry of Snifolk, and in 1702 was made Dean of Norwich. He died 1st November 1724. His nine works in Church history (1697-1724) were very popular. Directions to Churchwardens (1701; 15th ed. 1856); and The Connection of the History of the Old and New Testament (1713-17; 27th ed. 1876). The last treats with much learning, but less discernment, of the affairs of ancient Egypt, Assyria, Persia, Judæa, Greece, Rome, and Greece, so far as they bear on the subject of sacred prophecy. See Prideaux's Letters to John Ellis, edited by E. M. Thompson (Camden Soc. 1875).

Pride of China (also called Pride of India and Bead-tree), a handsome tree of the order Meliaceae (M. azedarach), a native of India, naturalised in the southern states of the American Union. It grows rapidly, has large bunches of flowers, and enormous quantities of small fruit. A decoction of the bark of its root is used as a vermifuge.

Prie-dieu (Fr., 'pray God'), a portable kneel-desk; a chair which may be used for kneeling in prayer.

Priego, a town of Spain, 46 miles SE. of Cordova, grows wine and weaves silk. Pop. 1578.

Prieure, anciently one of the 'twelve' cities of Ionia, stood a little NW. of the mouth of the Maeander in Caria. Here in the second half of the 19th century the remains of an elegant Ionic temple to Athene Polias were examined by an agent of the British Society of Dilettanti, who carried off and gave to the British Museum the stone bearing the inscription that recorded its dedication by Alexander the Great. See Antiquities of Ionia, part iv. (1882).

Priessnitz. See Hydropathy.

Priest (Gr. presbyteros, Lat. presbyter, Fr. prêtre), the title, in its most general signification, of a minister of public worship, but specially applied to the minister of sacritery or other mediatorial offices. In the early history of mankind the functions of the priest seem to have commonly been divided among the heads of each family, but on the expansion of the family into the state the office of priest became a public one. It thus came to pass that in many instances the priestly office was associated with that of the sovereign. But in many religious and political bodies, also, the orders were maintained in complete independence, and the priests formed a distinct and, generally speaking, a privileged class. The priestly order, in most of the ancient religions, included a graduated hierarchy; and to the chief, whatever was his title, were assigned the most subordinate of the religious offices which were connected with the body. In Egypt, the population is supposed to have been divided into three or four castes, at the head of which was the sacerdotal, or priests. This division, however, was not very strictly observed, as the son did not invariably follow the profession of the father. Thus the priest and his proper descendants and the principal classes of priests were in existence at the earliest periods—the hont, or prophets, and the ab, or inferior priests. The first were attached to the worship of all the deities of Egypt; and in the greater cities they there was hont, high, prophét, or priest, was头顶ed over the others; at Thebes there were as many as four prophets of Ammon. Their duties appear to have comprised the general cultus of the deity. They also interpreted the oracles of the temples. Besides the priests of the gods, others were attached to the worship of the king, and to various offices connected with the administration of the temples. The class of priests called ab, or 'pure,' were inferior, and were also attached to the principal deities and to the personal worship of the monarch. They were required to be scrupulously pure, and accustomed on their diet, bathing and fasting frequently. The priesthood of India belongs to the first caste, or that of the Brahman, exclusively (see CASTE, INDIA). But, as the proper performance of such functions requires, even in a Brahman, the knowledge of sacred texts to be recited at a sacrifice, and of the complicated ceremonial of which the sacrificial acts consist, none but a Brahman learned in one or more Vedas, and versed in the works treating of the ritual, possessors, according to the ancient law, the qualification of a priest. See also BUDDHISM, LAMAIISM.

In sacred history the patriarchal period furnishes an example of the family priesthood; while in Melchizedeca, king of Salem, we find the union of the royal with the priestly character. In the Mosaic law the whole theory of the priesthood, as a sacrificial and mediatorial office, is fully developed. The priest of the Mosaic law stands in the position of a mediator between God and the people; and, even if the sacrificer which he offered be regarded as but typical and prospective in their moral efficacy, the priest must be considered as administering them within the special, and not the moral value. The Mosaic priesthood was the inheritance of the family of Aaron, of the tribe of Levi (q.v.). It consisted of a High-priest (q.v.), and of inferior ministers, distributed into twenty-four classes. The age for admission to the priesthood is nowhere expressly fixed; but, from
2 Chronicles, xxxi. 17, it would seem that the minimum age was twenty. In the service of the temple the priests were divided into twenty-four classes, each of which was subject to a chief priest, and served, each company for a week, following each other. Their duties in the temple consisted in preparing, slaying, and offering victims, in preparing the show-bread, burning the incense, and tending the lights of the sanctuary. Outside they were employed in instructing the people, attending to the daily offerings, enforcing the laws, and the like. All of their maintenance were set aside certain offerings (see First-fruits) and other gifts. They wore a distinguishing dress, the chief characteristics of which were a white tunic, an embroidered cincture, and a turban-shaped head-dress. The Jewish priesthood may be said to have practically ceased with the destruction of the temple.

In the Christian dispensation the name primi-
vitely given to the public ministers of religion was presbyteros, of which the English name 'priest,' is borrowed from the Latin. Like its Greek original, it meant originally a ruler or presider. The name given in classical Greek to the sacrificing priests of the pagan religion, Gr. hierarros, Lat. sacrest, is not found in the New Testament explicitly applied to ministers of the Christian ministry; but very early in ecclesiastical use it came to be employed to designate those who, with all those bodies of Christians—Roman Catho-
liques, Greeks, Syrians, and other Orientals—who regard the eucharist as a sacrifice (see Liturgy) the two names were applied indiscriminately. The priesthood of the Christian church is one of the grades of the hierarchy, second in order only to that of bishop, with which order the priesthood has many functions in common. The priest is regarded as the ordinary minister of the eucharist, whether as a sacrament or as a sacrifice; of bap-
tism, penance, and extreme unction; and although the contracting parties are held in the modern schools to be themselves the ministers of marriage, the priest is regarded by all schools of Roman divines as at least the normal and official witness of its celebration. The priest is also officially charged with the instruction of the laity in all direction of their spiritual concerns, and by long-
established use special districts, called parishes, are assigned to priests, within which they are entrusted with the care and supervision of the spiritual wants of all the inhabitants. The holy ordel of priesthood can only be conferred by a bishop, and he is ordinarily assisted by two or more priests, who, in common with the bishop, impose hands on the candidate. The rest of the ceremonial of ordination consists in investing the candidate with the sacred instruments and erna-
mants of his order, anointing his hands, and reciting certain prayers significant of the gifts and the duties of the office. The distinguishing vestment of the celebrant priest in the mass is the Chasuble (q.v.). In Catholic countries priests wear ever in public a distinctive dress in most respects common to them with the other orders of Clergy (q.v.). In the Latin Church priests are bound to a life of celibacy. In the Greek and oriental churches married men may be advanced to the priesthood; but no one is permitted to marry after ordination. Priests are not permitted to marry a second time, should his wife die.

In the Church of England, and other Reformed Episcopal Churches, the term priest is retained as the designation of the second order of clergy, whose special office it is (1) to preach, (2) to pronounce the forms of Absolution in the Morning and Evening Prayer, in the Communion Service, and in the Office for the Visitation of the Sick; and (3) to preach, though this last office is, by special license, sometimes extended to deacons. See Deacon, Orders (Holy).

Priestley, Joseph, son of a cloth-dresser, was born at Fieldhead, near Leeds, 13th March 1733. For some time he was obliged to abandon school studies, owing to weak health, and betook himself to mercantile pursuits, but with great success. His literary studies were resumed at a dissenting academy at Daventry (founded by Dr Doddridge). Though his father and family were strong Calvinists, young Priestley, during his residence at the academy, fell in with Dr Whitefield and became imbued with the theological and metaphysical opinions of his youth. 'I came,' he says, 'to embrace what is called the heterodox side of every question.' In 1755 he became minister to a small congregation at Needham Market, in Suffolk. While here he composed his work against the doctrine of Christ's death being a sacrifice or satisfaction for sin, entitled The Scripture Doctrine of Remission. In this he taught that the Bible is indeed a divine revelation, made from God to man through Christ, himself a man and no more, nor claiming to be more, and that the doctrine of the sacrifice and the Atonement. In 1758 he quitted Needham for Nantwich; and in 1761 he removed, as teacher of languages and belles-lettres, to an academy at Warrington; and here his literary career may be said fairly to have begun. A visit to Ireland furthered the object of Franklin, who supplied him with books which enabled him to write his History and Present State of Electricity, published in 1767. It was followed by a work on Vision, Light, and Colours. In 1763 he published his Theory of Languages and Universal Grammar. In 1764 he was made LL.D. of Edinburgh, and F.R.S. in 1766. In the following year he removed to Leeds, having been appointed minister of the Mill Hill dissenting chapel there. A brewery beside his dwelling gave a new direction to his energetic and versatile mind; he began to study chemistry. In 1773 he was appointed literary companion to Lord Shelburne, and accompanied the earl on a continental tour in 1774. Having been told by certain Parisian savants that he was the only man of understanding with whom they had ever known who believed in Christianity, he wrote, in reply, the Letters to a Philosophical Unbeliever, and various other works, containing criticisms on the doctrines of Hume and others. But, while laughed at in Paris as a believer, at home he was branded as an advocate of the opinions of two heaths, and the latter imputation, he published, in 1777, his Disquisition Relating to Matter and Spirit, in which, partly materialising spirit and partly spiritualizing matter, he holds that our hopes of resurrection must rest solely on the truth of the Christian revelation, and that on science they have no foundation whatever. On leaving Lord Shel-
burne, he became minister of a dissenting chapel at Birmingham. The publication, in 1786, of His-

ory of Early Opinions concerning Jesus Christ occasioned the renewal of a controversy, which had long before begun, between him and Dr Horsley, concerning the doctrines of Free-will, Materialism, and Unitarianism. His reply to Burke's Reflections on the French Revolution led to his being made a citizen of the French Republic; and this led to a bomb on one occasion breaking into his house and destroying all its contents, books, manuscripts, scientific instruments, &c. A brother-in-law, how-
ever, about this time left him £10,000, with an annuity of £200. In 1791 he was elected to a charge at Leeds, but the innovations his sympathies had made him unpopular, and he (1794) removed to America, where he was heartily received. He died at Northumberland, Penn-
sylvania, 6th February 1804, expressing (though
he agreed that he should be called a materialist) his confidence in immortality. As a man of imprerachable character, serious of temper, fearless in searching after and confessing the truth, his services to chemistry are summed up at Vol. III. p. 147 (and see OXYGEN); recent research fully justifies Priestley's title to be called the father of pneumatic chemistry. Thorpe, at the British Association, 1830 (see Nature, xlii. 449), not merely defended the priority of his discovery of oxygen (1774) and of the composition of water (1781), but denied Lavoisier's claim to be considered an independent discoverer. See J. T. Rutt's edition of Priestley's Works (2 vol., 1852), and the Autobiographical Memoir; and Martinian's Essays, Reviews, and Addresses (vol. i. 1891).

**Priest's Holes.** See SECRET CHAMBERS.

**Prim.** Juan, Spanish general, was born at Reus, 6th December 1314, and rapidly rose to be a colonel, and so distinguished himself in war and statesmanship as to be made general, marshal, and marquis. As progressist he opposed Esparrtero. Failing in an insurrectionary attempt in 1806, he had to flee to England and Brussels, but here he guided the movement that in 1808 overthrew Isabella. He was war minister under Serrano, but soon became virtually dictator. He secured the election of an Italian prince, Amadeo, as king (in order, as was thought, that the king might be under the minister's control), and was thereupon shot by an assassin as he left the Cortes, 25th December 1870. He died on the 30th.

**Primaria Dona (Ital.),** the first female singer in an opera.

**Primage,** a charge (over and above the freight) paid by the shipper or consignor of goods for loading the same, to the master and sailors of a ship, or to the owner or freighter.

**Primary Colours.** See COLOUR.

**Primary Rocks.** See PALEOZOIC.

**Prime (Lat., primus),** anciently a bishop holding a position of pre-eminence. Thus the bishop of Rome was called primas of the whole church. In modern times the title belongs only to such sees as had formerly the dignity of vicar of the holy see annexed—Armagh, Arles and Lyons, Mainz, Toledo, Pisa and Salerno, &c. But none of these possess any special primatial jurisprudence. For the primate in the Church of England, see the article ARCHBISHOP. The name *primus* is applied in the Scottish Episcopal Church to the presiding bishop. He is chosen by the bishops out of their own number, without their being bound to give effect to seniority of consecration or preeminence of dioceses.

**Primates,** the name given by Linnaus in his system to the first order of Mammals (q.v.), which he placed first (whence the name, Lat. *primus*, 'first') because he ranked man amongst them.

**Prime,** the first of the 'lesser hours' of the Roman breviary. See BREVIARY.

**Prime minister.** See TREASURY, CABINET.

**Primero,** or **Prime,** a game at cards popular in England in the 16th century, but now obsolete. The same or a very similar game was played in Italy under the name primiero, and in France under the names *prime, ambusq,* &c. Primero belonged to the family of games of which the old pet and pair and the more modern brag and poker are members.

**Primitive Methodists.** See METHODISTS.

**Primogeniture** is the rule of law under which the eldest son of the family succeeds to the father's real estate in preference to, and in absolute exclusion of, the younger sons and all the sisters. See ENTAIL, FAMILY, FEUDALISM, FIRST-BORN, LAND LAWS, SUCCESSION; and the valuable monograph on *Primogeniture* (1895) by Evelyn Cecil.

**Primordial Zone,** a name applied by Barrande to the group of strata which in Bohemia underlies the Silurian rocks, and is therefore on the horizon of the Cambrian system.

**Primrose** (*Primula*), a genus of plants of the natural order Primulaceae, having a bell-shaped or tubular five-toothed calyx, a salver-shaped corolla with five segments, five stamens, a globose germen containing many ovules, and a many-seeded capsule opening by five valves, and generally with ten teeth at the apex. The dimorphism of the stamens and pistil of primrose, illustrated in the accompanying figure, is not uncommon in other species of the genus, and has given rise to the terms *thrum-eyed* (A) and *pin-eyed* (B) in the language of florists in describing varieties of the Auricula and Polyanthus. The distinction is of some practical importance in so far as fertilisation of the individual flowers is affected by the relative positions of the respective organs. The species are all herbaceous perennials, generally having only radical leaves; and the flowers in a simple umbel, more rarely with scapes bearing solitary flowers. Almost all of them are natives of Europe and the north of Asia. Some of them are among the finest ornaments of our groves and meadows; some are found in mountainous regions. Their fine colours and soft delicate beauty have led to the cultivation of some of

---

![Common Primrose (*Primula vulgaris*)](image)

Primroses; short (A) and long styled (B).
PRIMROSE LEAGUE

Prince Edward Island

PRINCE EDDIE ISLAND

species in spring. The Common Primrose (P. vulgaris), abundant in woods, hedgerows, and pastures in Britain and in most parts of Europe, has obviate-oblong, wrinkled leaves, and single-flowered scapes; the flowers about an inch broad, yellowish white. This is the plant to which the English name radish, the German farina (see), the Akim of Egypt, and with it the Cowslip (q.v.), or Pägle (P. veris), and perhaps still more nearly related is the Oxlip (P. elatior), apparently wild in some parts of England, particularly in the eastern counties, but supposed by some botanists to be intermediate between the common primrose and the cowslip, which they therefore regard as extreme forms of one species. The Polyanthus (q.v.) is a cultivated variety of the cowslip. The Auricula (q.v.; P. auricula), an Alpine species, is a favourite garden flower. The Bird's-eye Primrose (P. farinosa) and the Scottish Primrose (P. scoticana) are both flowers of exquisite beauty, found in the northern parts of Britain, the latter chiefly on the coasts of Sutherland, Caithness, and the Orkney Islands. The Alps and the Himalaya Mountains produce several species. The Chinese Primrose (P. sinensis) had for more than fifty years been very common in Britain, not only as a greenhouse but as a window plant. It produces compound umbels of very numerous lilac, red, or white flowers, which are displayed in autumn, winter, and spring. Two varieties occur in the eastern省份 of the American Union—the Bird's-eye Primrose (P. farinosa) and P. miutuscinica, both rare—and several varieties in the western states, the most conspicuous being P. perryi, with large purple flowers, which grows on the Rocky Mountains.

Primrose League. This political organisation was founded November 17, 1853, by Lord Randolph Churchill, Sir John Coston, Sir Alfred Salte, and Sir H. Drummond Wolff. The name was chosen in reference to the fact that the primrose was Lord Beaconsfield's favourite flower (a fact by some unkindly disputed; cf. Notes and Queries for 1888, pp. 149, 416); and the fivefold petal of that flower is taken to indicate the five principal divisions of the British empire in Europe, Asia, Africa, America, and Australia. This strictly Conservative society, by the moderation and even liberality of its professions, by its enlistment and organisation of women, by its distribution of titles and badges with its emblem, which is dear to all and accessible to all, has attained an enormous growth and great political influence. It was originally intended to admit men only, banded in companies of about 100 to act as missionaries of the league; and the effect of admitting women may be gathered from the fact that the number of members rose from 957 in 1884 to 237,293 in 1886. The numbers as given by the society in 1891 were: habitations, 2126, and knights, dames, and associates enrolled as members, 963,943. The founder of the association of the League was the Marquis of Salisbury, K.G. The head office is at 64 Victoria Street, Westminster. In July 1890 the first branch in Canada was established in Winnipeg. See an article by Sir A. Borthwick in the Nineteenth Century for July 1886.

Primulaceae, a natural order of exogenous plants, containing more than 200 known species, mostly natives of temperate and cold regions. They are all herbaceous, or scarcely half-shrubby, with leaves generally all radical, and no stipules. The calyx is generally five-cleft, inferior or half-superior, regular, persistent; the corolla, with the limb divided into as many segments as the calyx, rarely wanting; the stamina inserted on the corolla, one opposite to each of its lobes; the ovary one-celled, the style solitary, the stigma capitulate; the capsule with a central placenta and many seeds. Many of the Primulaceae have flowers of much beauty, and some are very fragrant, as the Primrose, Cowslip, Auricula, Pimpernel, &c.

Primula Mobile. See Ptolemy.

Prince (Lat. princeps), an epithet which was originally applied to the princeps senatus of the Roman state, and afterwards became a title of dignity. It was adopted by Augustus and his successors; hence the word was afterwards applied to persons enjoying kingly power, more especially the rulers of small states, either sovereign or dependent. The title is now very generally applied to the sons of kings and emperors and persons of the blood royal, sometimes with a territorial title (Prince of Wales, Prince of Orange), or with an addition, 'crown prince,' 'prince imperial,' &c. In various parts of continental Europe the title prince is borne by families of eminent rank but not possessed of sovereignty. Practically in Britain the term prince is restricted to members of the royal family (see PRECEDENCE). The eldest son of the reigning sovereign is by a special patent created Prince of Wales (see WALES, PRINCE OF). In France, under the old regime, dukes took precedence of princes; and many dukes had prince-doms as minor titles. Napoleon put his new-created princes above dukes. In Italy princes rank after dukes, sons of dukes being called princes. In Germany the ambiguity of applying the same title to the members of royal houses and princely families of the reigning line, the former being styled 'Prince,' the latter 'Prince of,' The German Fürst takes rank below the Duke (Herzog). Most of the counts who had a seat in the old German Diet were elevated to the dignity of Prince on their acquiescence in the dismemberment of the German empire (see Germany, Vol. V. p. 177). In a more general acceptance the term prince is often used for a sovereign or the ruler of a state.

Prince Edward Island is a province of the Dominion of Canada, having entered the confederation in 1873. It is situated in the Gulf of St Lawrence, and is separated from New Brunswick and Nova Scotia by Northumberland Strait. The greatest length of the island is 130 miles; its breadth varies from 4 to 34 miles, and it has an

Flowers of a few of the Primulaceae: a, Primula alkiniana; b, P. obconica; c, P. sieboldii; d, common primrose (P. vulgaris); e, cowslip (P. veris).
area of 2133 sq., i.e. about 1,563,400 acres, nearly all of which are occupied. Population in 1891 numbered 109,088, or 51 persons to the square mile. At 1763, when the first post was planted, the claim was made to it by the British on that account. Possession was assumed by the French, but little was done towards its settlement until 1715, when its fertility attracted some Acadians from Cape Breton. It was finally ceded to Great Britain in 1763. In the first part of it formed part of Nova Scotia, but in 1768 was made a separate province. The pop. in 1763 was 4000; but about that time an emigration set in to the mainland, and the Acadians were expelled, so that in 1768 it had been reduced to about 1300 (see ACADIA). Until 1799 it was called St John's Island, but its name was then changed to Prince Edward Island, in compliment to the Duke of Kent, who paid a visit in that year. Prior to 1875 most of the land was the property of absentee proprietors, and for many years the land question was a source of difficulty. The local government, however, passed a measure in 1875 giving them powers to buy out the landlords, and to sell the land to the tenants or others on easy terms of repayment. Out of the 843,981 acres acquired by the government in that way, all but 97,102 acres have been paid up to become freeholds. Although the arrears are being met in a satisfactory manner, the arrears being very trifling. By this legislation a fruitful source of irritation was removed, and the agricultural industry—the principal one in the province—placed on a more satisfactory footing.

Situated off the south coast of the mainland, the appearance of the island is exceedingly prepossessing. The surface is undulating, but never exceeds 500 feet; the soil is very fertile, consisting generally of a light reddish loam, and occasionally of a stiffer clay, resting in some places on red sandstone, although in other localities it seems to be entirely alluvial. All kinds of cereals, roots, and vegetables are raised. Oats and potatoes from the island enjoy a special reputation, and the same thing may be said of its sheep and horses. A natural manure, called mussels mud, and made of decayed oyster, clam, and mussel shells, is found on the coast of the island, and is used by the farmers, and is said to be a most valuable fertiliser. Although coal is known to exist, it is not worked, owing to the depth at which it is found and the cheapness at which it can be purchased from Nova Scotia. There are apparently no other mineral resources of the island, except the climate, healthy, being milder than that of the mainland, and freer from fogs. Winter is long and tedious, but the summer months are pleasant and enjoyable. Prince Edward Island is without doubt the best fishing station in the Gulf of St Lawrence, but the habits and feelings of the inhabitants are so decidedly agricultural that the fisheries have not received from them the attention they deserve. They consist chiefly of mackerel, lobsters, herring, cod, hake, and oysters; while salmon, bass, shad, halibut, and trout caught in limited quantities. In the year 1889 the value of the fisheries was $886,430; the catch included 13,450 barrels of mackerel, 33,940 barrels of herring, 21,196 cwt. of cod, 90,000 lb. of haddock, 748 cwt. of hake, 3730 lb. of halibut, 50,920 lb. of trout, 3646 barrels of cod, 13,140 barrels of hake, 4116 barrels of oysters, 2,069,947 lb. of lobsters, 13,647 lb. of cod and hake sounds, and 13,832 gallons of fish oils. The present annual value of the oyster fishery exceeds $120,000; and this industry is capable of vast development. Lobsters in 1889 were exported to the extent of 818,200 lb., of the value of $102,883.

The coast-line is a succession of bays and projecting headlands; the largest bays are Egmont, Hillsborough, and Cardigan, which by penetrating into the land from opposite directions form narrow inlets, dividing the island into three distinct districts. Charlottetown, the capital, and has a pop. of 13,000. Other principal towns are Summerside (3000), Georgetown, and Souris. The rivers are naturally short, but the province is well watered. Manufactures are not carried on to any large extent, and chiefly for local purposes. Shipbuilding was an important industry previous to the substitution of iron and steel for wooden vessels.

The exports for 1890 were valued at $875,964, divided as follows: Produce of the mine, $20; forest, $7575; fisheries, $187,743; agriculture, $864,688; manufactures, $122,388; paper and other wares, $19.3117. Imports were valued at $981,177. There is a railway, built and worked by the Dominion government, running from one end of the island to the other. The island is connected by telegraph with the mainland, and there is daily steam communication between the two, although it is occasionally interrupted during the winter. In 1891 the people were urging the construction of a tunnel under the Northumberland Strait, for the purpose of establishing communication with the mainland all the year round. The Dominion government is now discussing the question of the cost to be prepared. The tunnel would be some 7 miles long. According to the census of 1891, the settlers were largely of English, Irish, and Scotch descent, and French, Germans, and Scandinavians. The principal religious denominations were: Roman Catholiques, 47,857; Presbyterians, 33,072; Methodists, 13,596; Church of England, 6646. The Bishop of Nova Scotia exercises episcopal authority over the island, and the Roman Catholiques have one diocese, that of Charlottetown. Free education has prevailed since 1853. In 1889 the district schools numbered about 436. There are also grammar schools, private schools, a normal and a model school, and two colleges—the Prince of Wales (Protestant) and St Dunstan's (Roman Catholic). The government of the island is administered by a lieutenant-governor, appointed by the governor-general in council, and largely by the legislative council consists of thirteen members, and the assembly of thirty members, the latter being elected for four years. In the Dominion senate the province is represented by four members, and in the House of Commons by six.

Princeites, a name given to the Agapemone (q.v.) from the founder.

Prince of Wales. See WALES (PRINCE OF). Prince of Wales Island. See PENANG.

Prince Rupert's Drops. See ANNEALING.

Princes Islands (anc. Demanessow), a beautiful group of nine islets near the eastern end of the Sea of Marmora, about 10 miles SE. of Constantineople. They are the largest islets of Prince Islands. They are a favourite summer-resort of the Constantinople Greeks, and in old times were frequently a place of exile for those in disfavour at the Byzantine court. See Schilmerger, Les Îles des Princes (1884); S. S. Cox, The Isles of the Princes (New York, 1888).

Prince's Metal, a name, derived from Prince Rupert, given to an alloy of copper and zinc, in which the proportion of zinc is greater than in brass.

Princeton, (1) capital of Gibson county, Indiana, 161 miles by rail E. of St Louis. It has manufactories of woollens, flour, &c., and is in an agricultural region. Pop. (1900) 1641.—(2) A borough of New Jersey, 50 miles by rail SW. of New York. Pop. (1900) 3899. On January 3, 1777, it
was the scene of a battle between the British under Colonel Mawhood and the Americans under Washington, in which the former were defeated; here the Continental Congress sat, and from Princeton, Washington dined his farewell address to the army. Princeton, however, is chiefly cele-

brated as the seat of the College of New Jersey, popularly known as Princeton College, which, founded by charter in 1746, under the auspices of the President of New York, and its first university

mencement under its second charter at Newark in 1748. Liberal subscriptions were obtained both in America and in Britain, the Bishop of Durham being among the contributors, and the General Assembly of the Church of Scotland ordering a national collection. In 1766 the college was transferred to Princeton, on the erection of a hall named Nassau Hall in honour of William III. Within it hung a portrait of Washington. The College of New Jersey has had several distin-
guished Presbyterian divines for its presidents, as Jonathan Edwards and Dr James M'Cosh. Since the civil war benefactions have poured into the college; during the twenty years of Dr M'Cosh's presidency these exceeded $3,000,000. Post-graduate courses have been introduced, and the staff of instructors raised to thirty-three; the number of students is about 1100. Since its foundation, three of its graduates have been James Madison, fourth president of the United States, and many very eminent men. The college possesses a school of science and museums, laboratories, observatories, and libraries with 180,000 volumes. In 1896 it was transformed into Princeton University. The theological seminary, founded in 1812, is the oldest and largest (nearly 290 students) of the Presbyterian Church in Amer-

icas. It was the seat of the American Biblical Association in 1895. Princeton Quarterly ("new school"), which was succeeded by the American Presbyterian Review. See (anon.) Four American Universities: Harvard, Yale, Princeton, and Columbia (1895).

Principal. See Agent and Surety; also Accessory.

Pringle, Thomas, minor poet, was born at Blairclay (near Kelso), Roxburghshire, 6th January 1793. Lamc from childhood, dyspeptic, devout, he went at seventeen to Edinburgh University, and found beyond the bounds of its clergymen the Scottish Public Records Office. He took to writing at an early age, and, besides other literary schemes and ventures, started the Edinburgh Monthly Magazine, the parent of Blackwood, in which his own most important article was on the Gypsies, from notes supplied by Scott. In 1820 he set sail with a party of twenty-four emigrants of his father's family for Cape Colony. He travelled into the interior with the party, and had his heart stirred within him to see the inhumanity practised in the country among the Dutch and D'Kaiti residents alike. For three years he lived at Capetown as librarian of the government library at a salary of £75 a year. He started the South African Journal, and fought a brave fight for the freedom of the press. But he was bullied by the military and petty-minded governor of the day, Lord Charles Somerset, his schemes crushed, and himself reduced to poverty. He returned to London in 1826, and became secretary of the Anti-

Slavery Society. He died in London, 5th December 1834. His Ephe meris (1828) was a collection of graceful verse. The poems that related to the

African— the best "Afar in the Desert"— were reprinted in the volume of African Sketches (1834), a series of glowing sketches of South African scenery. Pringle's Poetical Works were edited, with a florid eulogium, rather than a life, by Leitch Ritchie (1839).

Printing is the art of taking, by pressure, prints or copies in reverse of an original design of a suitable character, reduplicated with pigment or ink. The word has a very wide application, and is used, for instance, in connection with such different processes as photographic 'printing,' in which no pressure is required, and callco-printing. A definition based upon the comparatively small and simple character of the category of 'prints' such operations as moulding, stamping, and embossing. The word has, however, acquired conventional limitations of meaning, and is now applied usually to the three methods of copperplate printing (see Engraving), Lithography (q.v.), and letterpress printing. The first two being already described, the present article will be confined to a description of the latter.

There is no doubt the Chinese practised printing in some senses of the word many centuries before it was known in Europe, as has been noticed at China, Vol. III. p. 196. The method commonly used down to the present time is one originally adopted by Foong T'ou in the 10th century. A piece of pear-tree wood is cut up into boards of about half an inch thick, and these into blocks large enough to hold the design. The blocks are planed, squared, and sized or var-

ished. The design to be engraved is drawn or written on thin transparent paper, and transferred to the surface of the block by rubbing. The engraver next cuts away the field, leaving the transferred letters in high relief. A block of this kind can be cut at about the same expense as it could be set up in movable metal types, and it needs no proof-reading or correction. For printing no press is used, the block being adjusted to a table, before which the wood stands, having a bowl of fluid ink on one side and a pile of paper on the other. In his right hand he has two flat-

faced brushes, fixed on the opposite ends of the same handle. One brush is dipped into the ink and swept over the face of the block, on which a sheet of paper is now placed; the other, which is then swept lightly but firmly with the dry brush at the other end of the handle, is used to moisten the paper— which is soft, thin, pliable, and a quick absorbent of fluid ink. Printing from movable types was, according to Klaproth, an invention of the Chinese, as early as the 12th or 13th century, as there are Coreen books printed from movable clay or wooden types in 1317. But the Chinese still prefer block-

printing; and printing from metal types in China is mainly practiced for circulating the Bible and for newspapers, according to materials invented by Europeans. About 6000 Chinese characters suffice for a missionary printing-office; but for magazine work about 10,000 are necessary. For the baseless tradition that Marco Polo brought the knowledge of block-printing to Europe, see Pola.

The art of printing by the use of movable types was invented in Europe about the middle of the 15th century; but no more definite statement concerning its origin can be made with confidence. The name of the country in which the invention was first typographically practised in the year of the invention are, up to the present time, matters of dispute. Modern researches have completely disposed of as a mere legend the wide-

spread belief that the invention of movable metal types, cast in a mould from a matrix formed by the letters printed once or more and used to print the same book, was the outcome of the use of wooden types, which it was formerly thought formed the link between the block-books common in the early part of the 15th century (see Wood-engraving)
and the earliest letterpress prints. Equally baseless is the belief that the first metal types were cut instead of being cast. The evidence on these two points is too minute and technical to be adduced here.

The controversy as to the invention of printing has lasted nearly four centuries, and it has unhappily been carried on with a vehemence and bitterness which perhaps no other controversy, not a religious one, has ever excited. Up to 1499 it was universally believed that typography was invented in 1440 by Johannes Gutenberg, the father of printing, and this belief was accepted without question. But it has since been proved that printing was invented in Holland in the early part of the sixteenth century, and that the art was discovered first of all in Germany, at Mainz on the Rhine; that it took place about 1440, but that, although it was discovered at Mainz, the first "prefiguration" was in Holland, in the form of the Donatianes which were printed before that time; that the claim of the Dutch printers to discovery was undoubtedly substantiated; that printing was communicated to the chronicler by Ulric Zell, a contemporary printer at Cologne. These statements may be attributed the commencement of the controversy ever since carried on. In 1588 Adrien de Jonghe ("Haidrnan Junius"), in his Batenia, printed by the Plantin office at Antwerp, gave the first circumstantial account of the alleged Dutch invention, which, he said, he had heard from old and trustworthy people. This, it was, he noticed, about a century and a half after the invention. Junius stated that in 1408 "Louvyn Janszoon," surnamed Coster (q.v.), lived at Haarlem; that he one day took a walk in the Hoof, and cut letters on the bark of a beech-tree; that he printed these letters on paper for the amusement of children; that he invented a suitable printing-ink, and afterwards began to print single sheets, which he printed from the wooden letters, or letters and tiles, of which he had made a complete set. Among his workmen was one Johannes—the surname was not given by Junius—who in 1441 stole the types and fled to Mainz, where he opened a workshop, and in 1442 published, with Coster's type, the Psalter of Lessius, and the Truths of P. Hispomanus. From this date, as already stated, the question whether printing was "invented" in Holland or in Germany has been fiercely debated, and scores of books have been written upon it. The titles of these are given in Bigmore and Wyman's Bibliography of Printing (3 vols. Lond. 1880-86). The controversy was renewed with much vigour, and unfortunately with much acrimony, in 1870; and it has since been maintained, the balance of evidence, or rather of probability—for of evidence there is an extraordinary lack—has fluctuated from one side to the other. In 1870 the "Costerians" included nearly all the leading bibliographers and typographical historians. An eminent Dutch investigator, Dr. van der Linde, published a series of articles, since translated into English (Lond. 1873) called History of the English Type-Casters from 1440 to 1715. The purport of the book was that the documents brought forward to support the claims of Coster were false, and that the arguments in his favour were devoid of any historical or bibliographical support. Van der Linde showed further that several of the documents on which the Costerians relied were actually frauds and forgeries. This exposure for a time completely routed the supporters of the Dutch claims. In 1878 the same author produced a companion volume, Gutenberg—Geschichte und Entdeckung aus den Quellen nachgewiesen, but there was little new in it. Mr. Hessels of Van Halen, a native of Mainz, who had spent several years in examining in Germany all the documents extant connected with the history of Gutenberg, and exposed a number of falsifications and forgeries which had passed current, space will not here suffice to recapitulate his discoveries; his book is indispensable to any one desiring an accurate knowledge of the subject. The result of his researches was more negative than positive. He said that he had not found anything which enabled him to answer in the affirmative or in the negative the question, Was Gutenberg the inventor of printing? Of the thousands of claims, which were relied upon by his supporters one is lost entirely, and the other two are only transcripts. Even if we accept these transcripts, he says, they point to Gutenberg only as a printer, and not as the inventor of printing. In 1888 Dr. van der Linde published from the General Archives of the Erfindung der Buchdruckerkunst. It was produced in magnificent style at the cost of the German government, but it added to our knowledge of the eminence nothing of importance. M. Hessels has since continued his investigations, and the result is indicated in the title of his book, issued in 1887, Haerlem the Birthplace of Printing, not Mainz. This important work virtually takes us back to 1499, when the Cologne Chronicle declared that the first idea of printing was found in Holland. The Costerians have now dropped and clumsy specimens of printing—some of which have been quite recently discovered—are generally allowed to be "Costerian." On the other hand, there is the magnificent Bible and Psalter undeniably printed by Gutenberg and his associates. It is difficult to believe that this work is inferior in any way to the Dutch claims. Possibly within some ancient bindings there exist at the present moment prints that would settle for all futurity the controversy which has raged for four centuries as to the "origines typographici." It has been mentioned at Gutenberg that after first and obtained possession by action at law of Gutenberg's office, and while he was carrying it on as a printing concern, Gutenberg, by the assistance of another capitalist, set up a second office. With two rival establishments in existence, it was impossible to keep secret the processes of printing. In 1402 the city of Mainz was sacked, and the catastrophic dissolved engagements between employers and employed, and caused many of the latter to migrate to other countries, taking with them, of course, their knowledge of the art. Printing spread with marvellous rapidity, considering the means employed.
PRINTING


Printing was brought to England in 1476 or 1477 by William Caxton (q.v.), who set up his office within the 'precincts' of Westminster Abbey—but not within the sacred building itself, as often erroneously stated. See William Blades's Biography and Typography of William Caxton (2d ed. Lond. 1882). The first hundred years of the history of printing in England was a period of great activity. In 1478 printing was done at Oxford by Theo. Rood; in 1490 at St Albans by an unidentified printer now called 'the Schoolmaster,' in the same year in the city of London by Lettou, and in St Cambridge by Sibberr. When the art had spread throughout the country, when education became more common, and men began to read about the questions and events of the day, it began to be seen by the authorities and rulers that a mighty power for good or evil had arisen in the land. Then it was deemed necessary to regulate the press. In 1530 censorship was established in England. It ushered in a period of lamentable decadence in the quality and quantity of the printing done. Printers were cruelly punished, especially during the existence of the unlicensed printers who were continually being abused, and often imprisoned, printers lost all enterprise and all social position. For many years there were no good printers at all. Censorship was abandoned in 1594. Then began a period of revival, greatly aided by the improvements in type-formatting and the use of the movable type, and the prevalence of the 'Bibulonia' towards its close. The 19th century has been one of marvels development, following the invention in 1814 of the steam printing-press.

It is believed that printing was introduced into Scotland in 1507. A patent has been discovered, of King James IV., which shows that a printing-press was established at Edinburgh during the year named. This patent was granted to two burgesses of the city of Edinburgh—Walter Chappie—m an in the law, and Nicol—Myllar, a bookseller who had learned in France the art of printing. The 'prent and expert men' to use the press came from France. The office was in the Southgate, now the Cowgate. As early as 1508 several small publications were issued. After these came the work for which the press was ostensibly established—the 'Aberdeen Breviary,' in two volumes, forming 1554 pages of small type. It was intended to become the standard Scottish service-book. Myllar was probably dead when it was completed, and with its publication Chappie's connection with typography came to an end. For many years subsequently all works of Scottish authors were printed in France. The next printer was Thomas Davidson, a practical man who in 1541 was chosen to print acts of the parliament of James V., which placed him in the position of king's printer. It is not necessary to catalogue the names or the works of his immediate successors. Up to 1600 the average workmanship of the Scottish printers was about as bad in quality as that of their later successors has been distinguished for its beauty, excellence, and accuracy. This is not the only noteworthy feature of early Scottish typography. The printers were astonishingly few in number; during 150 years after the introduction of the art there were only about a dozen master printers who were natives. During the first hundred years only twenty-five different works are known to have been printed in Scotland. See R. Dickson and J. P. Edmond, Annals of Scottish Printing from the Introduction of the Art to the Beginning of the 17th Century (4to, Cambridge, 1890)—a most exhaustive and trustworthy book.

The first printing-press set up in America was introduced by the vicerey of Mexico, Antonio de Mendoza, and the first book printed by it in the New World was Lo Resumen de la Vida de Nuestra Senora de Loreto (1536). The earliest press in the British-American colonies was brought over for Harvard College in 1638. The Bay Psalm Book (1640); see ELIOT, JOHN was its first important work; but in 1639 it printed the Freeman's Oath and an almanac. The first press in Philadelphia was set up in 1685, in New York in 1693. See I. Thomas, History of Printing in America (2d ed. Albany, 1874).

The practical art of letterpress printing consists essentially in coating certain relief surfaces with printing-ink, and then transferring that ink to the fabric, such as paper. The relief surface may be in a form of movable types or an engraved design cut in wood or metal, or a block east or electrotype from the type or the engraving; and the impressing is effected by the press or machine presently to be described.

Types are cut, cast, or otherwise formed from various materials, though the printer recognises only two kinds—wooden ones, which are cut to form the larger letters used in placards, and metal ones. All books and newspapers and the great bulk of books and pamphlets found in libraries are printed from metal types. A complete assortment of type of any one particular style is called a 'font,' and may vary in amount to any extent, according as it may be required in large or small quantities. The individual type is a piece of metal about 1 inch long with a letter, point, comma, or other similar printing device cut in relief on one end as shown in fig. 1. The notch shown on one side is to enable the compositor to place it right side up when 'setting' without the trouble of looking at the letter. The difference between 'foundry' types, a 'lower' and 'upper' case, the former holding the small letters (technically called 'lower case' letters in consequence), A Type, figures, commas and points, spaces to put between the words, 'quads,' &c. The upper case holds the capitals, small capitals, and the less often used sorts. The cases, wooden trays divided into 'boxes' by

![Upper Case](https://example.com/upper-case.png)

![Lower Case](https://example.com/lower-case.png)

thin slips of wood, are shown diagrammatically in fig. 2. The lower case is arranged not alphabetically, but so that the letters most used will be nearest the compositor's hand and have the largest...
Of sixteen after being printed. In making up the pages to the sheets, each form, as the classes containing the type are called, are required, one for each side of the sheet. If a printed sheet of sixteen pages be opened out, the pages will be seen to be arranged in the following order:

<table>
<thead>
<tr>
<th>Inside of Sheet</th>
<th>Outside of Sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>2</td>
</tr>
<tr>
<td>d</td>
<td>14</td>
</tr>
<tr>
<td>g</td>
<td>1</td>
</tr>
<tr>
<td>j</td>
<td>11</td>
</tr>
<tr>
<td>m</td>
<td>7</td>
</tr>
</tbody>
</table>

And the pages in the chase must be so arranged, or "imposed" as it is called, that, when printed, they will so appear. When ready for printing or stereotyping, as the case may be, another proof is read for final correction. In some cases where great accuracy is required, such as in the present work, as many as six or eight proofs are "read" at different stages.

When the types have been printed or electrotyped and returned to the composing-room they are distributed by the compositors to the cases again for further use, and this can be done with wonderful rapidity, though great care must be used to avoid putting the letters into the wrong boxes. Several very ingenious machines have been invented for setting type (see TYPE-SETTING MACHINES) which have been more or less successful. They are worked something after the manner of type-writing machines (see TYPE-WRITER), but are too complicated to be described in detail within our limits. Several of the latest of these cast and set the type by one movement. Thus as the labour of re-distributing the types has been done with they are melted again. These machines are used for newspaper work.

In most printing-offices the men govern themselves by a voluntary association called a "chapel," which, although often (but not necessarily) connected with the printers' society, is independent so far as the individual affairs of the office are concerned. The office-bearers are called the "father" and "clerk" to the chapel, and it has elaborate sets of rules for regulating trade and personal affairs within the office.

Letter presses are coated with ink (see INK) by means of "composition rollers." These consist of cylinders of small diameter covered with composition made according to various recipes. Amongst them are glue, treacle, and Paris white; glue, sugar, and glycerine; glue, glycerine, sugar, and india-rubber, &c. These are melted, mixed together, and cast in cylindrical moulds of various diameters, according to the requirements of the machine or press. The glue and treacle composition was first used for printing by the engineers Donkin and Bacon in 1813; up to this time the types having been inked by pot-balls. The present system of inking the types was invented by Mr Edward Cowper in 1818. Leather and other substances were tried at first, and the machines in which they were used were discarded owing to the unsatisfactoriness of their rolling or inking arrangements. A good roller must be tenacious of ink, elastic, and retain its suction. It must not shrink, become hard in cold weather or soft in hot weather. The recipe for making it is varied according to the machine for which it is required—whether working on fine surfaces such as engravings, or at a high speed, as for newspaper work.

The earliest known representation of a printing-press is dated 1507, and it pictures an apparatus which is little more than a modification of the ancient wine-press. The essential feature is a flat
board, since known as a platen, which is movable vertically, and presses on a forme of type laid on an unresisting hard surface parallel to it. The two, between which was the paper, were brought together by a powerful screw, and thus the paper was squeezed down on the forme. This rudimentary appliance was improved from time to time, as is shown in various pictures of printing-office interiors. The wooden printing-press was brought to its ultimate degree of perfection in the later part of the 17th century. Moxon, the first technical writer on printing, described in 1683 what he called 'a newly invented press.' This was the old wooden press as improved by Blaeu of Amsterdam (fig. 9). This press continued to be generally used until the close of the 18th century. About 1800 Charles Mahon, third Earl Stanhope, was instrumental in producing a much improved printing apparatus.

![Old Common Press](image)

The press which bears his name was made entirely of iron, and the strength thus obtained enabled a forme to be printed on it double the size of that which could be done on a wooden press. There was a most ingenious system of links and levers, by means of which the approach to the type of the platen, and its withdrawal, were accelerated. The greatest leverage and consequently the greatest pressure were obtained when the forme and platen came into contact. These arrangements enabled the pressmen to print at the rate of 200 per hour on one side of the sheet or 100 per hour on both sides. After this several inventors turned their attention to the improvement of the hand-press. Clymer, an American, in his Columbian press, discarded the screw, the central feature of previous presses, and gained his power from a combination of powerful levers. About 1823 an excellent press, called the Albion, was brought out by Mr. R. W. Copeland of London, in which the pressure was gained by forcing an inclined bar of steel from a diagonal to a vertical position, forcing down the platen, the impression taking place when the piece of steel was brought into the vertical position. The Columbian and the Albion presses enabled the printer to print on one side of the paper at the rate of 250 sheets per hour. Such presses are now, except for peculiar kinds of work or when very few impressions of a forme are required, quite obsolete, being superseded by 'machines' on which the various operations of press-work are done more or less automatically.

The earliest inventors of 'printing' machines coupled together the two arts of printing on paper and on calico and other textile fabrics. Adkin and Walker in 1772 patented a machine which was the type of a modern rotary letterpress machine. It was 'for stamping and printing' on paper, cotton, and other cloths, 'whereby the printing on such materials would be greatly facilitated and rendered much less expensive, and more perfect and exact.' The words fully and clearly indicate the importance of rotative motions of roller and forme in printing. Amongst other suggestions of a cognate nature made about this time the most remarkable was that of William Nicholson of London, the editor of a scientific journal. In 1790 he took out a patent which foreshadowed nearly every fundamental improvement into what we now call rotary printing-machines of the present day. He contemplated an apparatus in which forms or plates were to be fastened to the surface of a cylinder; the inking to be supplied by a roller and distributed by smaller rollers; the forme to be cylinder-fed, the paper being caused to pass between the printing cylinder and one covered with cloth or leather. Nicholson never actually constructed a machine, and although his patent was a marvellous forecast of the methods soon to be adopted in letterpress printing, he remains as the honour of being the inventor of the printing-machine.

Hitherto the evolution of the type-printing machine from the calico-printing machine has been completely overlooked by historians of printing, yet the connection is almost obvious. Nicholson's apparatus was closely similar, to the same extent that the distinction of first actually making a printing-machine was reserved for a German printer, Freidrick König (q.v.), who commenced experiments with the modest, and, as it proved, mistaken view of accelerating by making more automatic the ordinary hand-presses. He came to London about 1800, and patented a new platen-machine. The idea was but crude, and never put into execution. It is not unlikely that about this time König became acquainted with the ideas patented by Nicholson (see Goebel, Friedrich König und die Erfindung der Schnell-pressen, Stuttgart, 1853). At any rate König abandoned his project for accelerating flat printing. In 1811 he took out a patent for what we would now call a single-cylinder machine—i.e. one in which the impression was given by a cylinder, the inking being done by rollers, and the paper carried through the apparatus on tapes. The type bed moved to and fro, and the cylinder had an intermittent or stop motion, affording time for the feeding of the sheets. The glue and treacle composition had not been discovered, and leather ink-rolling or Moro ink-rolling was used instead. The Times was so struck with the apparent possibilities of this method of printing that he engaged König to make for him a double-cylinder machine which should print two copies of a forme of the newspaper, but on one side only of the sheet at once. This was completed in 1814, and on the 28th November of that year a newspaper was for the first time in any country printed by a machine driven by steam-power. This machine printed 1800 impressions per hour, completing 900 sheets, and it was called the König's Times Press. In 1818 Edward Cowper invented several important improvements, including a flat ink-distributing table, with distributing-rollers, forme-inking rollers, and ink-fountain. These principles are still to be found in single-cylinder machines. Cowper was called upon by Mr. John König to improve his press, mainly by taking away the old ink-rolling apparatus and substituting his own. In the same year König patented a perfecting machine which resembled two single-cylinder machines placed with their impression-tubes towards each other. The sheet was conveyed from one cylinder to the other by means of tapes so arranged that in the course of its track it was turned over and the second side presented to the second cylinder. At the first cylinder the sheet received its impression from the
first forme, and at the second cylinder it received its impression from the second forme. Cowper also improved on this machine, which printed 750 sheets on both sides of the paper per hour. The principle of the first perfecting machine has not been considerably departed from in subsequent machines of the same class, but improved methods have been devised for carrying the sheet from one cylinder to the other and turning it.

Reference, extremely brief and imperfect, has now been made to the origin of two out of the three distinct classes of printing-machines at present in use. These are, first, the single-cylinder machine, printing one side of the sheet at one operation, from a forme lying on a flat bed; second, the double-cylinder or perfecting machine, printing both sides of the sheet at once, also from a forme on a flat bed. The third class comprises the rotary machines, printing both sides, but from a circular forme—the impression surface, as well as the printing and the inking surface, being cylindrical, and capable of continuous rotation. The machines of the first and second classes are adapted for single sheets of paper; the rotary machines print reels or continuous webs, the portion forming a sheet being severed after printing. It is in this latter class of machines that the greatest improve-

ments—amounting almost to a revolution in the art of printing—have been achieved. (For a technical account of the several classes, see Principles and Progress of Printing Machinery, by the present writer, Lond. 1889.) Limitations of space preclude more being given here than a bare list of successive improvements.

In 1790, as already mentioned, Nicholson patented a rotary machine, but he never constructed one. In 1813 Bacon and Donkin patented a machine in which the types were fixed on a revolving prism, the ink being applied by a roller, and the sheet of paper wrapped on another prism. The machine was a failure, although it embraced an important feature, the inking-roller made of composition. Three years afterwards Cowper patented a method for printing paper for paper-hangings and other purposes. This embodied another valuable feature—the taking a cast from the type and bending the cast round a cylinder. It was a far more practical idea than the subsequent one of Rowland Hill, who, to procure a curved printing surface, proposed the use of tapering types to be fixed on the cylinder. In 1848 Applegath invented a machine, the type-cylinder of which was vertical and nearly 6 feet in diameter, around it being placed eight other cylinders, containing sheets of paper to be printed. These were led in from a horizontal position, and then brought to the vertical position. In 1857 the Times discarded this machine in favour of one patented by Hoe of New York, very similar in construction, but the cylinders were horizontal. It was found that the complication arising from eight or ten feeders was most objectionable, causing frequent stoppages, excessive waste of paper, and great risk to the machine and the material, while the working cost was heavy. Each of the machines printed on one side only. They were the first machines fitted with 'flyers'—a device for mechanically delivering or taking off the sheets. It was, however, considered at the Times office that the name of improvement could only be obtained by constructing a machine simple in its arrangements, capable of printing both sides of the paper at one operation, and which could print, not single sheets, but continuous webs of paper, thus dispensing with layers-on. There were enormous difficulties in the way of printing, cutting, and delivering the paper, difficulties which the non-professional reader could by no means realise. In 1866 a machine of the kind was constructed under the superintendence of Mr. J. C. Macdonald, the manager, and Mr. Calverley, chief-engineer of the Times. The Walter Press, as this machine was named, has since been slightly improved, but remains practically the same, and is shown in fig. 6. The types are stereotype by means of a paper-maché mould, which, being bent inside a hollow cylinder, produces, when cast, a stereotype which fits on the printing-cylinder of the machine. The paper, unwinding from the reel, first passes between damping-cylinders, then over the printing

Fig. 6.—The Walter Press.
cylinders, and is finally cut and delivered at the
other end of the machine. Two boys and a man,
who superintends the machine, supply all the
manual labour required. The speed is about 10,000
perfect sheets per hour, equal to 20,000 impressions
by the apparatus previously mentioned. The more
recent machines have an attachment for folding,
which make two, three, or four folds as required.

Mr Walter of the Times is entitled to the
honour of being instrumental in introducing the
system of rotary printing for news-work, just as
his father deserves that of having introduced steam
machine-printing. The Walker press was soon
adopted as the pattern of a number of machines
constructed in Britain and abroad. Some of these
machines much developed the idea of the Walker,
and embodied fresh and important improvements.
In 1870 Messrs George Duncan and Alexander
Wilson, of Liverpool, brought out their 'Victory'
machine, which included the folding arrangement
since added to the Walker press.

By this apparatus newspapers of
various sizes are printed, folded,
delivered, and counted into
quires or any portion required,
at the rate of 200 per minute.

Since about 1870 the rotary
system of printing has been
gradually adopted in the offices
of all newspapers having even
moderately large circulations.
Factories for producing rotary
machines have been established
in various parts of England,
while many such machines have
been imported from France,
Germany, and America. The
most improved and the fastest
machines made up to the present
time are those of Messrs Hoe &
The most improved of these
machines print four or six page
papers at the extraordinary
speed of 48,000 per hour, or 800
per minute. Papers of eight,
ten, or twelve pages can be printed at a speed of
24,000 per hour, and a sixteen page paper at 12,000
per hour. The papers can be pasted down the
centre margins if required, and counted as delivered
in quires of any number fixed upon. The machine
delivers the papers, inset, pasted, cut top and
bottom, turned out as compact as a pamphlet, and,
by the addition of a device largely used in America,
even folded and wrappered ready for use. This
speed is effected by using a reel of paper of double
width, about 8 feet wide, on which can be printed
duplicate sets of plates. So greatly has the art of
Stereotyping (q.v.) been improved that eight stereoplates
from one forme can now be moulded, cast,
and finished ready for the machine in eight minutes.
Fig. 7 shows the double-web Hoe machine.

The printing business
is divided into three de-
partments — those con-
cerned respectively with
jobbing or commercial
work, book-work, and
with news-work.
The improvements of late
years in the mechanism
and the processes of the
two are equally im-
portant with those in the
last. The character of
ordinary jobbing work
has been greatly bettered
by the liberal use and
correct selection of col-
ours, by the introduction
of ground tints, and by
the artistic taste infused
into the design. The
typefounders have pro-
vided the printer with
more beautiful types and
more diversified orna-
ments, and both press-
men and compositors have utilised with intel-
ligence and skill the materials at their command.
Jobbing work is chiefly done on small plate
machines, invented by an American, G. P. Gordon,
and introduced into Britain as 'Minerva Presses'
in 1866. There are many varieties now made of
this apparatus. Larger work is done on machines
having one or two cylinders. Those of the
'Wharfedale' pattern, invented about 1860 by
William Dawson and David Payne of Otley,

Fig. 7.—Hoe Double-web Machine.

Wharfedale, Yorks, have one cylinder, and print
only one side of the paper at a time.
The essential parts of the single-cylinder machine
(fig. 8), now constructed by engineers in Europe
and America, with small alterations in pattern,
may be regarded as five : the impression applicaness
of the cylinder; the arrangements for carrying the forms of type up to and under the cylinder, by contact of which it receives the impression; the inking of the type; the laying on of the sheet; the taking off or delivery of the sheet when printed. The cylinder, which is a hollow drum, having an opening on its under side, is placed almost in the middle of the machine. The table of the machine on which the forms are placed has racks on its under surface gearing into the traverse wheels, from which it derives motion to and fro. By means of racks it also causes the rotation of the cylinder by which the impression of the form is effected. The inking system may be thus outlined. There is at the extremity of the machine and running across it a duct or ink reservoir, with an adjustable side-piece called the knife, which regulates the outflow of ink. A composition roller in motion, called a vibrator, takes a streak of ink periodically and transfers it to the ink-table, which forms part of the table and of course moves backward and forward. The ink is evenly spread or distributed over the ink-table by 'distributors.' The table then passes under the inking-rollers which alone touch the forms and give it the proper coating of ink. The distributors and rollers are coated with 'composition,' referred to on p. 410. The feeding apparatus is also ingenious. A pile of paper is laid on to the desk-like table shown at the right-hand side of the machine, and a key stands at the end or at the front side of it and 'strikes' the sheets down till the front edge of one comes in contact with a series of metal fingers or clutches called grippers. These open and take a sheet by its edge, and hold it secure while the cylinder is turning round, and the printing taking place. At a certain point the grippers release the sheet, which then goes into the taking-off apparatus. A second set of grippers seize it and carry it round the wooden flyer cylinder, from whence it emerges on to travelling tapes. A large comb-like appliance called the gate oscillates up and down, having the sheet in front. The pressure of the air causes the sheet to adhere to this until it assumes a horizontal position, when it drops on to the taking-off board. While the first side of the sheet is being printed, two points, by an ingenious arrangement, make small holes in the paper; and when the sheet is turned to print the second side, these holes are again placed on the 'points,' thus ensuring correct register.

Machines with two cylinders are called perfecting machines because they perfect or print both sides of a sheet before delivering it. Generally they may be said to be duplicated single machines, with two printing-cylinders, two tables for type, and an inking apparatus at either end, much as described under the single-cylinder machine. The sheet is printed on one side at the first cylinder, when a set of grippers on the second cylinder take possession of it and print the second side, and it is delivered by the flyer as described. The varieties of these machines are numerous, and fig. 9 shows the Marinoni, a well-known type, used in the printing of the British editions of the present work. These machines can print in the very finest manner from 1000 to 1500 perfectoed sheets per hour, according as they may be complicated with illustrations or not.

When the types are to be printed from direct, as already mentioned, the chase containing the pages is put on the bed of the machine. When stereotype or electrotype plates are used they are carefully dressed to an exact size and thickness, the latter about ¼ inch of an inch. The requisite number of wooden blocks are then put on the machine-bed, locked in a chase. These blocks are of the proper thickness to make up the plates to type-height (about 1 inch). The plates are fastened to the blocks by brass catches at the sides and ends, and when locked up are as solid as type.

Before printing, however, a laborious process called making ready has to be gone through. When many wood-engravings are in the pages several days may be taken up making ready a single sheet. This process is for the purpose of making the impression equal all over and properly printing the wood-engravings, and can be judged of by comparing a carefully printed book with a daily newspaper, which is printed just as it comes without any making ready. It is too technical for detailed description within our limits.

It is not long since that it was a firm article of belief among printers that fine work could not be done except on a press provided with a platen. And up to quite recently all paper was first thoroughly wetted, then printed, then dried, and then pressed to restore the surface, of which the damping deprived it, and to give it a certain gloss. Between the forme and the platen of the press or the cylinder of the machine a thick, soft, yielding blanket was placed, which was supposed to produce a better impression from the inequalities of engravings and type. There has been a radical change in opinion and practice on these important points. It has been found, since machines
have been brought to their present degree of perfection, that they give far superior results to those from presses— their impression is stronger, more solid, and more uniform, and the sheets can be laid on them with a precision unattainable by hand presses. Paper is not now made spongy and stretchable by being wetted, and the result of working in the press is that the impressions of the characters are of greater brightness, and the delicate lines of engravings are printed finer, clearer, and cleaner. Improvements in ink-making have much conduced to this desirable result. Paper has been produced for book-kinds with a special propriety. Early printed sheets, which admits of a far more excellent impression than that formerly procurable. The soft blanket has been discarded, and the padding or covering of the cylinder is now generally as hard as it can be got. The aggregate results of these alterations may be seen by a comparison of the present issues of an illustrated newspaper with those of fifty years ago. Up to about 1840 there was actually no press strong enough to properly print a woodcut of 48 square inches in superfine; now, woodcuts of 2000 square inches, or 90 inches by 40, are printed in the usual way with perfect simplicity. The improvements of the pictorial journals are often admirable reproductions of works of high art; it is within the memory of persons of middle age that the first crude attempts were made to print such pictures.

BIBLIOGRAPHY.—Historical: In addition to the works referred to in the text may be mentioned Karl Paulmann, Illustrirte Geschichte der Buchdruckerkunst (Vienna, 1882), his Die Erfindung der Buchdruckkunst, nach der neuesten Forschungen (Vienna, 1881); Theo. de Vigne, The Invention of Printing (New York, 1877); and Van der Linden, Geschichte der Erfindung der Buchdruck (3 vols. Berlin, 1886). There is no complete history of printing in the English language, but in Bigners and Wyman's Bibliography of Printing (3 vols., London, 1890) some of the most useful books will be found under the names of Ames, Arber, Bayles, Dibdin, Herbert, Hansard, Humphreys, Hessel, Luckombe, Otley, T. B. Reed, Sotherby, Timperley, and Watson.

Practical.—Southworth, Practical Printing (2 vols. 3d ed. 1887), and Printing Machines and Printing Machine (1888); Waldow, Illustrirte Encyclopadie der Grafsehnen Kunst (Leip., 1884); Descriptions, Nouvelles de Typographie (Paris, 1888); F. J. F. Wilson, Printing Machines (3d ed. 1885); F. J. Jacobi, Printing (1890); The American Dictionary of Printing and Bookmaking (3d ed., New York, 1888); America'n Encyclopedia of Printing (New York, 1871). Besides, a multitude of small yet useful books have been written on separate branches, and for the use of professional students of the art. See also the following books on the TRATION OF BOOKS, LITHOGRAPHY, PAPER, PRESSES (Freedom of the), PROOFS, STEREOTYPING, TYPES.

PRINZENRAUB

PRIOR

PRIOR, Matthew, was born 21st July 1664. Some doubt prevails as to his birthplace; but the bulk of the evidence points to Wimborne Minster in East Dorset. His father is said to have been a joiner, who, coming to London, probably to educate his son, took up his abode in Stephen's Alley, Westminster, where the future poet was then under the redoubtable Dr Busby. His father died, and, his mother being unable to pay his schoolfees, he fell into the care of his uncle, a vintner in Channel (now Cannon) Row, who took him into the toil and toil of perfect man. The sailor-like clothes of Horace and Ovid attracted the attention of Charles Earl of Dorset, and other visitors to the Rhinish Wine House, with the result that he returned to Westminster, his uncle finding him in clothes, and Dorset in books. At Westminster he formed a life-long friendship with John Dryden, a friendship which, when founded by George Montague, the elder of whom afterwards became Earl of Halifax, in order to follow his friends to Cambridge. Prior, against Lord Dorset's wish, accepted a scholarship from the Duchess of Somerset at St John's College. He was admitted Bachelor in 1686, and in the following year wrote with Charles Montague the clever parody of Dryden, entitled The Hind and the Panther transvers'd to the Story of the Country-mouse and the City-mouse, which, according to some, he wrote in the same night of the copy of Dryden. In April 1688 Prior obtained a fellowship; and his composition of the yearly college tribute to the Exeter family, a rhymed exemplum upon Exodus, iii. 14, led to his going to Burleigh as tutor to Lord Exeter's sons, and, on his master's death, to be removed to Italy, and Prior applied (through Fleetwood Shepherd) to his former patron Dorset for advancement. He was, being then twenty-six, made secretary to Lord Dursley, afterwards Earl of Berkeley, then going as ambassador to the Hague. In Holland Prior remained some years, finding especial favour with King William. In 1697 he brought over the Articles of Peace at the treaty of Ryswick; and, after being nominated Secretary of State for Ireland, he was made secretary in 1698 to the Earl of Portland's embassy to France, continuing in that office until 1700. In Scotland he found favour both with Anne and Louis XIV. In 1699 he became an under-secretary of state, the university of Cambridge made him an M.A., and he succeeded Locke as commissioner of trade and plantations. In 1701 he entered parliament as member for East Bedfort. His plantations, from the Terri, and in 1711 was employed in the preliminaries of the peace of Utrecht, going to Paris as ambassador in the following year. With the queen's death in 1714 came the triumph of the Whigs, and in 1715 Prior, returning to England, was immediately imprisoned. In 1717 he was excepted from the Act of Grace, but was, none the less, subsequently discharged. The remainder of his life was passed chiefly at Down-Hall in Essex, a country-house purchased partly with the profits from a subscribition edition of his poems and partly with the assistance of his friend Lord Harley, at whose seat of Wimpole he died, 18th September 1721, being then in his fifty-eighth year. He was buried in Westminster Abbey, under a monument decorated by his bust by Antoine Coysevox, given to him by Lord Marlborough. His poetical scenes, The History of Richardon (National Portrait Gallery), by Belle (St John's College), Kneller, Dahl, and others.

Of Prior's abilities as a diplomatist there are diverse opinions. Pope sneered at them. But Bolingbroke and Swift extolled them; and it is stated that the archives at Paris show him to have been far able and more resourceful than is generally supposed. As a poet, in which capacity he is now remembered, he holds a unique position. Without much real sentiment or humanity, his verses have a wit, a grace, a neatness and a finish, which link him to the lighter Latin poets on the one hand, and to the best French writers of familiar verse on the other. Cowper praised his 'easy jingle,' Thackeray 'his good sense, his happy easy turns and melody.' He collected his poems, described by himself as consisting of 'Publick Panegyrics, Amorous Odes, Serious Reflections, or Idle Tales' (many of which had been contributed to Dryden's and other miscellanies), in 1709, and again, in extended form, in 1718. By this latter issue he made 1440 guineas. The satire on Dryden's pieces, Simon, the Vanity of the World and a paraphrase of the old ballad of the Nut Brown Maid, are not now thought to be his best, although they had considerable popularity with the readers of the 18th century. But a third long poem, Alma; or, the Progress of an Unhappy Woman, a 'climacteric' full of wit and waywardness. His Tales resemble the French contes too much in their objectionable
qualities to be palatable to the English taste. He lives mainly by his purely playful efforts, his lyrics and his epigrams, not a few of which are unsurpassable. In the kind of piece known to the French as vers d'occasion he is unrivaled, and his beautiful stanzas to A Child of Quality have been as fortunate as Gray's Elegy in a Country Churchyard, setting the tune to a host of plagiarists. In 1740, long after his death, two volumes were published, one containing alleged Memoirs, in which there is little of his, and the other a number of posthumous verses, among which are some of his best. These are included in Evans's two-volume edition of 1777. Thehecakesy wrote admiringly of Prior in his English Humourists (1853). See his Selected Poems, edited by the writer of this notice (Parchment Library, 1889); an article by Sir G. A. Aitken in the Contemporary Review for May 1890; and the edition of Prior's works by R. Brinley Johnson (2 vols. 1892).

Priscian (Lat. Priscianus), surnamed Cassarins, born or educated in Cæsarea, is in point of reputation the first of Latin grammarians; his treatise was in universal use as a text-book during the middle ages. Priscian flourished in the beginning of the 6th century: Paulinus Diaconus calls him a contemporary of Cassiodorus (468-562 A.D.). He taught Latin at Constantinople, and enjoyed a government salary. The work which has preserved his name is his Commentariorum Grammaticarum Libri XVIII. The first sixteen books treat of the different parts of speech; the remaining two, of syntax. The work shows great learning and good sense, and contains quotations from many Greek and Latin authors no longer extant. Priscian also wrote six smaller grammatical treatises, and two hexameter poems of the didactic sort, De Laudc Imperatoris Anastasii and a free translation of the Periegesis of Dionysius. The best edition of the grammatical works is that by Horta and Keil in Keil's Grammatici Latini, vols. ii. and iii. (1853-60); of the poems, by Bähr, in Poetae Latinhi Minorae, vol. v. (1883).

Priscillian, the chief propagator of the doctrines professed by the sect known from his name as Priscillianists. They spread widely in Spain during the last third of the 4th century, and lingered there till the beginning of the 5th century. The first seed of their doctrines is said to have been carried into Spain by a Memphian named Marcus, whose earliest disciples were Agape, a Spanish lady, and Helphinus, a rhetorician. Priscillian was a man of noble birth, pious and well educated; and his eloquence and boldness of character soon gathered round him a group of devoted followers, including two bishops, Instantius and Salvianus. From their hands he received episcopal ordination, and he established his see at Avila (Abila). Hyginus, bishop of Cordova, was the first to take action against these innovators; but his measures were covered with reproaches by the ultra-orthodox and fanatical. Priscillian's most determined enemies were Idacius, bishop of Emerita (Merida), and Iulicius, bishop of Sosonea. He was condemned and excommunicated at the synod of Saragossa (381), with three others, of the leaders of the party. They next went to Rome to clear themselves before the pope, but were denied audience, and at Milan on the return journey they met as little sympathy from Ambrose. Under the vallating rule of Gratian, however, they prospered, and the war between the two parties ended in the usurpation of Clemens Maximus. From the judgment of the synod of Bordeaux (384) Priscillian appeared as Paul to Cesar, and was at length summoned to appear at Treves. Martin of Tours was in favour of tolerant measures, but after his departure the fanatical party prevailed, and Priscillian, with others of the party, was condemned and put to death—the first who suffered death for heresy (385). Many Priscillianists recanted after the synod of Toledo (400), and soon after that of 447 they disappear altogether. Their doctrines contained 10 tenets, of which three were of the most distinctive, and the rest were mere speculations on primitive dualism, the doctrine of emanations and astrological fatalism. They practised rigid asceticism, and eschewed marriage and the use of animal food. One dashing hit on their morals was that absolute veracity was only obligatory on the lower orders; and there were those who still were made against their morality; but it should be remembered that the only accounts we have are those of bitter enemies, and their principles, originally obscure enough, have been made darker by a cloud of calumny. If the Priscillianists violated the laws of nature,' says Gibbon, 'it was not by the licentiousness but by the severity of their lives.'

See Mansel's Gnostic Heresies and Neander's Church History; also Mandernach's Geschichte des Priscillianismus (Treves, 1851). Scheppe claims to have discovered some of his writings in an enlarged edition of the Scholion to the Scriptorium Ecclesiasticorum Latinorum (Vienna, 1888).

Prism, in Geometry, a solid figure which can be most easily conceived of if we imagine a number of plane figures (triangles, quadrilaterals, &c.) exactly similar in form and size to be cut out of paper on a square or circular plate, or other, and then the whole plate to become one body. It will thus be seen that the top and bottom of the prism are similar, equal, and parallel to each other, and that the sides are plane figures, rectangular if the prism be 'right' (i.e. if in the above illustration the pile of plane figures lies upon a perpendicular plane, and rhomboidal if the prism be 'oblique' (i.e. if the pile slope to one side); but under all circumstances the sides of a prism must be parallelograms. The top and bottom faces may be either triangles, squares, parallelograms, or quadrilaterals of any sort, or figures of five, six, seven, &c. sides, provided only both are alike; and the number of sides is the plane figure which forms the top or bottom of course determines the number of faces of the prism: thus, in a triangular prism, there are five faces in all (three sides and two ends); in a quadrangular prism, six faces (four sides and two ends), &c. If two of the faces, one being 'right,' and the other 'oblique,' have their bases of equal area, and be of the same vertical height, their solid content is the same, and is found by multiplying the area of the base by the vertical height. The paralleloipid is a quadratic prism, and the cube is a particular case of the paralleloipid.

Prism, in Optics, is a triangular prism of glass or other transparent substance, its two ends being isosceles triangles, and having most frequently a very acute vertical angle, which gives the prism the appearance of a long wedge. It is the most important instrument in experiments on the refraction of light, and, in the hands of the most eminent optical philosophers, has been the means of largely adding to the science of optics. See OPTICS, REFRACTION, SPECTRUM.

Prisoners of War are those who are captured from the enemy during naval or military operations. By the laws or recognised principles of war, the entire people of a vanquished town, state, or nation become the absolute property of the victors. In ancient times the treatment of prisoners of war was very severe. In the Greek wars it was no uncommon thing to put the whole adult male population of a conquered state to the sword, while the women and children were enslaved. Although the putting to death of prisoners became less frequent, they and their families were commonly reduced to slavery to as recent a period as the 15th
century. The act of Napoleon in putting to death the Turkish prisoners of war at Jaffa in 1799 was universally condemned, and is probably the last instance of such barbarity. By degrees the mere humane custom of excusing prisoners came into practice, these not exchanged being kept in confinement on very poor fare. Notwithstanding frequent exchanges, large numbers of prisoners escaped the common law and consequently the bond of allegiance, and consequently the prison of war, was many of the officers being released on parole (q.v.).

**Prisons.** Formerly used for the purpose of restraint chiefly, it is only within recent times that imprisonment has been studied as a means by which certain high objects are to be attained, and which therefore render theconducted according to recognized principles. It used to be believed that nothing more was required than to ensure the security of the victim or culprit, by chains and fetters if necessary, unless it were to inflict on him all the further bodily pains and penalties, the smallest of which would be the breach of the prison regulations, and the death of the warden ordered by design. Imprisonment was not mentioned in the Anglo-Saxon laws as a punishment, but was enforced when an offender committed a punishable crime; and the punishment was, as well as specified by statute for particular offenders; nevertheless gaols were actually used more for securing the persons of those committed to them than as places of punishment. Under the common law all gaols belonged to the king, and by 5 Hen. IV. chap. 10 it was enacted that none but the common gaol should be the place of imprisonment for offenders brought before a justice of the peace. But there were many "franchise" gaols owned by great persons, or by towns, or by the crown, and gaols were lawful places for carrying out imprisonment ordered by the persons or bodies to whom these privileges were granted as a part of the criminal jurisdiction placed in their hands. In many cases these bodies had the power of life and death. In the reign of Edward VI. and Queen Elizabeth a new description of place of confinement was introduced—viz. the "briddles" and "houses of correction" for vagabonds, &c. By James I. chap. 4, every county was required to provide such an establishment with suitable instruments and appliances in it for setting idle people to work. Another sort of prison is of quite recent introduction—viz. the reformatory and industrial school, institutions which are under private management, but derive the greater part of the funds by which they are maintained from public sources, and are subject to certain general rules and conditions intended to secure efficiency and to prevent abuse, compliance with which is ensured by government inspection. These institutions are for the reception of juveniles whom modern philanthropy has rightly more appropriate for the latter. Reformatories are places of punishment for juveniles under sixteen years of age who are convicted of crime, and sentenced to ten days' imprisonment or more. Industrial schools are not intended for punishment at all, but are intended to prevent children becoming criminals through parental neglect or misconduct. A child must be under fourteen years of age to justify his being sent to an industrial school. There are therefore (1) prisons to which adults are sent for punishment and reformation; (2) prisons to which juveniles are sent for punishment and reformation; (3) industrial schools; (4) reformatory schools; (5) prisons or places of compulsory detention to which juveniles are sent as a preventive measure, called industrial schools. To the first of these are sent also persons who are charged with a crime to await their trial, and persons committed by county courts for debt, &c. In 1879, 47,000 French were prisoners in England, while 10,300 English languished in the prisons of France. By the end of the Franco-German war of 1870-71 about 300,000 French troops had been sent to German provinces, prisoners of war, many of the officers being released on parole (q.v.).

*Copyright 1891, 1897, and 1900 in the U.S. by J. B. Lippincott Company.*
employed on useful labour. Chap. 74 of the 19th Geo. Ill., after reciting that 'the punishment of felons and other offenders by transportation to His Majesty's Colonies and Plantations in America attended with many Difficulties,' and enacting that such offenders might be transported elsewhere, and that offenders who might be sentenced to be burned in the hand might instead be fined or whipped, proceeds to say that 'whereas, if many offenders convicted of crimes for which Transportation hath usually been inflicted were ordered to solitary imprisonment accompanied by well-regulated labour and religious instruction, it might be the means under Providence not only of deterring others from the commission of the like crimes, but also of reforming the morals and improving the habits of industry, it shall be lawful to appoint supervisors who shall erect penitentiaries where such persons may be ordered to imprisonment and hard labour. The first hulks were established in 1776; and this fatal temporary expedient serves to illustrate the scream as to the superior permanency of temporary expediency, for the last hulk was not closed until a fire destroyed it in 1857; and in fact they had a perfect representative in Gibraltar prison, which was constructed on the model of a hulk and developed all the iniquities of these establishments, and which was closed by the increased opposition to its abolition by the local naval and military authorities. Many years were destined to pass before the permanent penitentiary system became a fact. Great efforts were made to revive the transportation system, and in 1787 a new penal colony was founded in Australia. This with the hulks continued to form the punishment next in gravity to capital execution until the last hulk was closed in 1857 and the last batch of convicts was sent to Western Australia in 1867. It is not necessary to describe the hulk system, if system it can be called in which the inmates were herded together in unchecked association, where 'vice, profaneness, and demoralisation developed, as might be expected, among persons of the basest character, of whom the worst and the most demoralised were likely soon to take the lead, and after they had been to the hulks for a lifetime were described by a committee of the House of Commons in 1832 as 'well fed, well clothed, indulging in riotous enjoyment by night, with moderate labour by day, so that life in them is considered a pretty jolly life. But the hulks flourished in full vigour for many years, after the last one was closed in 1867, and in fact an attempt was then made to abolish them, which was the only way to put an end to the evils so forcibly commented on.

The history of the phases through which the control and supervision of the hulks passed is, however, of consequence, as it explains the present administration of the convict prisons and shows what methods failed, and furnishes warnings against adopting certain suggestions that are made from time to time. The hulks were at first, like all other prisons, placed under the management of the local justices, who appointed the overseer, and the overseer appointed the officers; the justices also made the overseer contractor for the maintenance of the prisoners, and as it was obviously his interest as contractor to cut short the supplies of food and clothing for the prisoners, they therefore by the darkness of a criminal interest should be diametrically opposed to his duty and to the welfare of the prisoners in his charge. The supervision of the hulks resided in the Court of King's Bench, who steadily neglected their duty, and the inspector provided for by parliament was not appointed in the way desired by the Home Secretary usurped power over these establishments, and his action was endorsed by parlia-

ment in 1815; and their connection with the King's Bench was severed in 1823. An Inspector was appointed, and after that a superintendent; and after some years the inspection of the hulks was in 1850 vested in the Board of Directors of Convict Prisons, with whom it now rests. The control of Millbank Prison, Pentonville Prison, and Parkhurst Reformatory was confided to the same body.

Transportation to Australia, which was commenced in 1787, for many years provided for only a small part of the persons subjected to that sentence or whose capital sentences were commuted for transportation. Until 1816 an average of only 474 prisoners was transported annually to Australia, but after that the number amounted to 4920. Transportation in its most flourishing days was characterised by evils which rivalled if they did not sometimes surpass those of the hulks.

Whilst, however, it was in full vigour a step was taken, feebly and slowly indeed, towards the creation of the penitentiaries intended in 1776 to form a permanent substitute for transportation to America. Millbank Prison (q.v.) provided means for the confinement of every prisoner in absolute separation, according to the modern doctrine, and it was intended that treatment should be on the most advanced reformatory system; but this experiment went no further at this time. In 1833 the existence of the terrible evils which attended the transportation system were formally established by the report of a commission, who said that the system was unequal, without terror to the criminal class, corrupting to both convict and colonist, and very expensive, and they recommended punishment in penitentiaries instead.

Various improvements in the Millbank system were introduced after this, and finally in 1842 it took the form of passing the convicts through two stages of discipline in certain prisons at home before sending them to complete their sentences in one of the colonies. The first of these stages was passed in a prison in which each inmate was kept in complete separation and brought under influences by which he was prepared for the foundation reform in his character; the second in a prison in which he was employed in useful public works in regulated association, but confined in a cell by himself by night and at all times when not at work or in chapel. The complete efficiency of this stage began to be felt at that period. The convicts being placed in association at night, but for some time past the separation has been thoroughly carried out, the only exception being in the cases of prisoners who on medical grounds cannot properly be left alone. The first stage was regulated according to the system adopted, first experimentally, at the new model prison at Pentonville which had been erected in 1842. When the experiment had been proved to be successful, convicts were sent to undergo it at Millbank Prison and at other prisons of which the construction was suitable.

In those early days of the formation of the convict system the confinement of prisoners in complete separation was regarded with great prejudice. This arose from the reports of its results in certain prisons in America, where it had been some years before carried out with the accompaniments of its darkness of a criminal interest, of cruel and inhuman treatment, and unwholesome sanitary conditions. It was therefore decided after some experiments, and as a sort of compromise with the prejudices above referred to, that the period of separation should be limited to nine months. Since the date when this decision was made, much improvement has been gained, and the unsoundness of the grounds on which this limitation was founded has been fully
demonstrated (see the Report of the Directors of Convict Prisons, 1887-88, and the accompanying report of an inquiry into the subject by the medical inspector). The whole of the prisons in the United Kingdom where sentences up to two years are carried out have gradually been remodelled on the sententious lines laid down by that Board, and by several foreign countries, after full investigation, permit of the isolation of prisoners under proper conditions for much longer periods. There is, therefore, no reason why the separate stage of a sentence of penal servitude should not endure for a period of these years, and those sentenced in that condition under a sentence of imprisonment.

The second or public works stage was carried out in prisons like Portland, which was constructed for the purpose in 1847. Dartmoor Convict Prison was opened in 1850 for the same purpose, Portsmouth Prison in 1852, Chatham in 1856, &c. In these the convicts have been employed in large public works, in farming, &c. The breakwater at Portland, the fortifications of that island, the large extension of the dockyards at Chatham and Portsmouth, the forts which protect Chatham, and various other works, both public and private, besides the construction of large prison establishments, attest the advantages of the system, which also enables the prisoners to gain a useful knowledge of trades by which they can obtain employment on their release, and affords them an immediate influence in accustoming the prisoners to habits of industry.

From 1844, and more rapidly after 1852, the number of prisoners actually transported gradually diminished; most of those who received that sentence were discharged on free pardon in Britain after serving their terms, and a smaller number were transported for shorter periods, as the result of amendment of practice and legislation. In the course of time the opposition of the Australian colonies to the continuance of transportation led to the abandonment of the system altogether, and since 1867 no convicts have been sent to those colonies. The punishment of penal servitude was by various acts passed between 1833 and 1864 substituted for transportation. These acts introduced certain notable modifications in regard to sentences of the next degree of gravity to capital punishment. When transportation was in force, and in some cases, the sentence was passed might be treated in any of various different ways. Commencing his sentence in the local prison, where he remained until it was thought proper to remove him, he might be transferred either (1) to Australia, from which in all probability he never returned, whatever the length of his sentence; (2) to Gibraltar or Bermuda, from which he was brought back to England when he had served a certain portion of his sentence, and there discharged; or (3) to the hulks, or to the 'public works' prisons substituted for them. If he went to Australia he was in the early days assigned as a servant to some free settler, and so at once ceased to be actually a prisoner; but in later years a system was established under which all prisoners first passed a certain time in a convict establishment and then were discharged conditionally, to have to the hulks or to the 'public works' prisons which replaced them, or to one of the convict establishments abroad. If sent to the hulks or 'public works' prisons they might either remain there till discharged, or be drafted off to one of the convict establishments in the colonies. When transportation was abolished and the segregation of the convicts was followed, in none of them did they pass the whole of their sentences in the condition of prisoners, a most important consideration to bear in mind. Those who were sent to Gibraltar or Bermuda, as well as those who did not leave the country at all, but were confined in the hulks, were released on free pardon after they had passed about half of their sentences or a little more. Those who went to Australia were detained usually for four years, but in their case only on certain conditions, by which a hold over them was maintained. When the objections of the Australian colonies to the continuance of transportation thither made it necessary to adopt some other plan for disposing of those prisoners whom the Penal Code considered in that condition under a sentence of imprisonment.

Under this act a sentence of transportation could not be passed for less than fourteen years, and a sentence of penal servitude was substituted for all lower terms. But the sentences of penal servitude permitted by this act were shorter than the sentences of transportation assigned to various crimes under the old acts, because it was intended that those sentenced to transportation who would not be passed in confinement; the terms were therefore fixed so as to correspond with the periods which had actually been passed in prison by convicts who had been sentenced to transportation but not actually sent out of the country. For seven years' transportation or less, transportation was substituted for penal servitude; for over seven but not over ten years' transportation was substituted not under four years and not over six years; for over ten but not over fifteen years' transportation was substituted not under six years and not over ten years; for over fifteen years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substituted for any term of sentence. After seven years' transportation was not substitut
offence which might be punished by seven years' transportation. In carrying out this act prisoners were allowed to gain remission of a portion of these short sentences as well as all the others.

About this time very warm discussions were being carried on as to the subject of penal systems, originating in the expectation of the Act of 1857, which necessitated by the gradual abolition of transportation; and about 1861-62 those who attacked the system which had actually been introduced were able to point to a recent increase of crime as a justification of their attacks on it, maintaining that the expectation of the time had been overruled. Great points were given to this feeling, and it was much intensified, by an outbreak of crimes of violence in the metropolis (garrotting), of which the number rose to eighty-two during the six months beginning June 1862, having been only sixteen in each six months from the beginning of 1860 to June 1862. The result was that a Royal Commission was appointed to report on the Penal Servitude Acts and the system adopted to carry them out. In consequence of the report of this commission in 1864 another Penal Servitude Act was passed, in which they did not adopt the recommendations of the Royal Commission as above set forth, but they raised the minimum term of penal servitude from three years to five years, except in the case of those who incurred a second sentence of penal servitude, in whose cases seven years was the minimum term permitted. This latter provision was repealed by the Prevention of Crimes Act, 1879.

A review by the light of later experience of the grounds on which the recommendation of the Royal Commission was made cannot but lead to the opinion that the expectation of the Act of 1857 has been too short to justify the formation of any sound opinion of its effects. As regards the outbreak of violence in the metropolis, this was without doubt, as subsequent events showed, the work of a small number of men who adopted that form of robbery (a very common feature in the history of crime), and when those men were arrested and received exemplary sentences the crime ceased altogether.

The remarkable feature of the figures for 1856-63 was that they were especially high in 1862-63, but rather the extraordinarily low level to which they have subsequently fallen in 1866, and from which they rebounded.

The directors of convict prisons in their recent annual reports had more than once referred to the anomaly peculiar to the United Kingdom by which no sentence was possible between two years—which was practically the limit of a sentence of imprisonment—and five years, which is the shortest legal sentence of penal servitude, and had expressed their opinion that it was desirable to introduce the power of sentencing to penal servitude for terms as low as three years, which existed from 1837 until the Act of 1857. Adopted by the recommendation of the report of a Royal Commission, founded, as the directors showed, upon erroneous deductions from imperfect data. In 1891 an act was passed to allow of the sentence of three years being imposed in future. By the Act of 1837 power was given to the Secretary of State to release convicts conditionally before the expiration of their sentences. This system, known as the ticket-of-leave system, was at the time strenuously attacked, under the erroneous supposition that it was introduced a system of releasing prisoners before they had completed their sentences; but this is not the case, as has been already stated, they never actually had done. On the contrary, under the ticket-of-leave system they were in point of fact detained to serve in prison a larger part of their sentences than had been customary before. Moreover, under the new system, instead of being absolutely pardoned when released, they were subject to revocation of their licenses if they did not conduct themselves well, by which their abstention from crime was materially guaranteed.

The principle on which the system of punishment is founded is founded on the idea that those who are subject to it should suffer discipline of such degree of severity as may act as a deterrent to them and to others who might be tempted to become criminals, but that they should at the same time be brought under the reformatory influences of religious teaching, good government, and education. It is by giving certain advantages to industry and good conduct, as well as inflicting suitable punishment for the reverse. Every effort is made to prevent that mutual contamination which was such a serious blot on prisons of the old type, and those prisoners who have not been previously convicted and are on inquiry found clearly to be only beginners in crime are formed into a separate body, who, from the badge by which they are distinguished, are called the Star class, and who are kept strictly apart from all others. The mode of carrying on the work is as follows: Every convict who receives this sentence is placed for the first nine months in a prison in which his whole time is passed in a separate cell, except, of course, the time devoted to public worship, necessary exercise, &c.; but at all times he is as far as possible isolated from his fellows. The remainder of his time in prison is passed in one of the large establishments in which useful work is carried on in a regulated association, and he is able by industry combined with good conduct to earn a remission of nearly one-fourth of his sentence, besides gaining certain privileges which are only available in regard to letter-writing, visits from his friends, and such like indulgences, and a gratuity to be paid to him on his discharge. The practice which existed until 1864 of encouraging industry and good conduct by certain increases in the diet was discontinued from that date, as it was held that to allow a prisoner more or better diet than absolutely necessary led to undesirable contrasts with poor but honest folk who could afford no such indulgences; and it will easily be seen that this principle, which is of course applicable to other things besides diet, makes it absolutely necessary to have a suitable system of rewards for prisoners while retaining the necessary penal or restrictive conditions of prison life.

At the head of every convict prison is the Governor, whose duty it is to administer and supervise all branches of the prison. He is assisted by a staff who have to control and regulate the discipline and employment of the prisoners, and a staff of clerks, who keep a record of all matters relating to the prisoners and their sentences, their conduct, &c.; and also by a steward or storekeeper, with assistant stewards, who are responsible for the maintenance and accounts. The chaplain conducts divine service, visits and advises the prisoners. He has under him schoolmasters, who conduct their education. A Roman Catholic priest is appointed to some prisons, and in them are collected all the prisoners of that denomination. The medical officer has charge of matters relating to the health of the prisoners. The hospital is constructed on the most modern principles, and provides accommodation for some patients in separation and for the association of those for whom the medical officer thinks it necessary. To this body a body called the Directors of Convict Prisons was created for England and Wales by statute in 1850, whose powers unite those of visiting justices of ordinary prisons with those of various bodies which had been created by parliament from time
to time to govern the various institutions thenceforward placed under their management—viz. Millbank Penitentiary, Pentonville Model Prison, Parkhurst Reformatory, the hulks, and the convict prisons at Portland, &c. The hulks for the herring fishery were superseded. A similar body was created for Ireland in 1824, and there a system founded on and closely resembling that which had been developed in England was created; but until 1888 (when a convict prison was established at Peterhead, and the prison hulks for the herring fishery were abolished) all male convicts sentenced in Scotland served the greater part of their sentences in convict prisons in England. The convict prisons are visited frequently by one or more of the directors, whose duty it is to see that the governor and the other officers of the prison are doing their duty, to hear and determine reports of misconduct of prisoners of such gravity that the governor cannot deal with them under the powers vested in him, and to hear and determine reports against the prison officers. To directors also the prisoners can complain or appeal if they consider they are not fairly treated, or bring forward any requests they have to make, but which the governor has no power to comply with. A body of gentlemen from among the magis-
trates is also appointed by the Secretary of State to act as independent visitors, and so form a fair and impartial guarantee against abuses in the prison, and a channel by which any grievances felt by any prisoner can be brought forward.

Each day marks are awarded to every prisoner according to his behaviour, and thus is measured daily his progress towards attaining that remission of about a quarter of his sentence which he is allowed to earn, as well as towards his promotion to a higher class, in which he may enjoy certain privileges before referred to. The punishments inflicted on those prisoners who misconduct themselves consist of close confinement, sometimes in a semi-darkened cell, reduction of diet, and forfeiture of the privileges already earned, such as gratuity to be paid on discharge, periodical visits, letters, visits from friends, &c., and forfeiture of remission, flogging, or being branded as a "cat" or a bird, which is awarded only in the gravest cases, such as assaults on warders, &c.

The cessation of transportation in 1867, and the consequent accumulation in the United Kingdom of all prisoners discharged on expiration of their sen-
tences who misconduct, instead of to a distant colony, might reasonably have been expected to increase the amount of serious crime, by the return of many of them to their former habits of life. As a matter of fact no such result has followed. On the contrary, the various influence which have been at work to check and repress crime, among which a well-regulated prison system may claim its due share, have enormously reduced the number of convicts under sentence.

About the beginning of the reign of Queen Victo-
ria, the population of England and Wales was about fifteen millions; there were 45,000 convicts in New South Wales and Van Diemen's Land, besides others in the colonial penal settlements, in the hulks at home about 3000 or 4000, several hundred at Millbank, about 900 each at Bermuda and the Bermudas, Antigua, &c. The number of those who misconduct, and whose conduct is so formulated, is now one of the matters of statistical inquiry. The number of prisoners, &c., in 1824 was 2219; this number has continually fallen, till in 1889 it was only 1039, and in 1890 only 828; yet during the interval the population of Great Britain has risen from 25,529,184 to (1891) 57,740,283. In Ireland the population of about 5,500,000, in 1869 there were 191 sentences of capital punishment, and in 1889, with a population of about 4,700,000, there were 83 such sentences. Of the present convict prison population in England and Wales, 515 have been placed on the Star class. These are found practically to be of an entirely different stamp from the habitual prisoners. They are more easy to manage, more willing and industrious, and experience shows that but few of them come back to a convict prison on reconviction after their discharge.

As regards the health of the prisoners in convict prisons, the statistics show that the favourable conditions under which they are placed on account of the great attention to sanitary requirements, the regularity of their lives, and the constant medical care taken of them result in a low mortality and a high percentage of remission, and this result is brought about in spite of a large proportion of the inmates of prisons being persons of low type, who have led dissipated and irregular lives. The conduct of the prisoners is, as a rule, very good; the result of a steady system of control under which exact discipline is enforced, and, while good conduct and industry are encour-
ged, misconduct is surely punished. The greater number of prisoners conform to the regulations so readily that either they do not inure any report or punishment of any kind, &c., most commit some trifling breach of regulations; and in fact the great bulk of the prison offences are committed by a few habitual offenders against the rules.

The prisons in which sentences of imprisonment are carried out have a separate history from that of those which have been described. There were so far back as two centuries ago occasional pro-
tests against the abuses and cruelties practised in prisons, and a notable parliamentary inquiry into the misconduct of a gaoler named Bembridge was held in 1730; but until the last quarter of the 19th century the idea that prisons into the strange claim for humane treatment had hardly made any way beyond the circle of a few philanthropic reformers; any attempt to use the period of im-
prisonment to improve the nature of the criminal was almost unknown. The way to better things was undoubtedly opened by Howard's visit and report on prison inspection about 1776, and in following years, and by his reports on the condition of the prisons he visited, followed as they were by pro-
posals for reform and improvements which were not immediately followed, but were engag-
ed in. The idea of improvement was at length encouraged by the statute of 1774, which gave to visit and inspect these prisons three times in each quarter, and to report on them to quarter sessions. In 1814 the appointment of chaplains was made compulsory. But compliance with these statutory reforms did not immediately follow, for indeed it was a long time before they had any practical effect. In 1818 there still remained 518 prisons in the United Kingdom, to which more than 100,000 prisoners were committed in the year,
and only twenty-three of these had been subdivided so as to enable the above classification to be carried out. In fifty-nine of them the males were not divided from the females (and in fact there was no statutory injunction to this effect until 3 Geo. IV. c. 59 was passed); it was therefore employment of any kind for the prisoners; in 100 of the gaols overcrowding was excessive; no less than 13,657 prisoners were crowded into the space which, according even to the moderate demands of those days, was fit for only 8545. The prisons were in many cases so ill provided that they became places of abandoned wickedness. In 1835 and 1839 most important legislative steps were taken. Further rules of administration were laid down in the acts passed in those years, and inspectors of prisons were appointed to see that they were carried out. By the latter act also the vital importance of a suitable design and construction for gaols as an aid to good prison management was recognised by the creation of the office of Surveyor-General of Prisons to advise in these matters.

Howard had advocated the complete separation of the sexes, and the confinement of each of them in a cell alone, and this was provided for in the Penitentiary Act, 1778. The practice was adopted in a few county prisons, and it was again enjoined together with daily divine service and the absolute separation of males from females in 3 Geo. IV. chaps. 65 and 83, but the expense of building these cells fortified a prejudice against the 'solitary' system, which was largely increased by the too thorough mode in which it had been carried out in America. A commission which was sent in 1834 to America to inquire into the matter, however, reported entirely in favour of prisoners in all gaols long as long as they remained in the hands of so many independent local authorities, by the great difficulties, amounting to impossibility, in getting some of the local authorities to provide proper prison buildings, and by the unnecessary costliness which resulted from the existence of so many small and independent prisons; for there were still no less than 113 of these establishments in England and Wales, 57 in Scotland, and 38 (besides 95 bridewells) in Ireland. The consolidation which has resulted from them has made a very large saving in the cost of pay- ments of prisoners in the several prisons in England and Wales, 15 in Scotland, and 22 in Ireland. In Scotland the geographical conditions have led to the adoption of a system of licensed cells under charge of the police, where prisoners under sentence not exceeding fourteen days may be retained. These are allowed in twenty-eight places to avoid the necessity of sending such prisoners long distances to serve a short sentence. The population of these little prisons is for the most part from one to two. In the years 1876-77, the last in which the prisons were under the local authorities, 8700 of these establishments were in England and Wales, more extensive of new buildings and interest on loans, &c., was £495,068; in 1880-90 it was £529,381; and it has since fallen still further. The diminution would have been larger but that in various prisons the service has been improved. In the Catholic prisons, in order to be spared and paid for their services; the clerical work formerly largely done by prisoners is performed by paid clerks; attention is more generally paid to the schoolboarding, and more money expended on schoolmasters. These acts have also ensured substantial uniformity of treatment throughout the United Kingdom, because all rules are now made by the Secretary of State or Lord-lieutenant of Ireland.

Prisoners before trial form a separate class in the prisons, and are now subjected to no more inconvenience than is necessary to ensure security and due order and discipline in the prisons and their own clothes and supply their own diet if they choose, have full opportunities of receiving visits from their friends and corresponding with them, and are not obliged to perform any unaccustomed or menial labour for themselves if they will pay for assistance.

Debtors also are kept apart from other prisoners. The rules made in the Prisons Act, 1865, with regard to this class of prisoner were not so far framed in view of the practice of imprisonment for debt which had not then been abolished by law. But the act successfully carried the principle which had been made possible to imprison only those debtors who refuse to pay when they have the means, and as this is a species of fraud they hardly deserve the consideration which, under the rules, is accorded to them. They are under no obligation to work, are allowed to lounge about in association, may provide their own clothing, bedding, and food, which may include wine and beer, and are allowed more frequent visits and letters from their friends than criminal prisoners.

The Prisons Act, 1865, also allowed the creation of a class of misdemeanants of the first division, who might be put in that class by the sentencing court; and the special sympathy accorded to sedition and seditious libel led to persons found guilty of these crimes being, by the law of 1877, secured in the privileges of this class. They are allowed a specially furnished room, and may provide their own clothing, bedding, and food, the services of an assistant to clean their rooms, and, on payment, full use of books, newspapers, &c., and certain privileges as to additional letters and visits at the discretion of the visiting committee. They are not considered criminals at all events. Doubts have sometimes been expressed whether the power of making a distinction of this sort in the punishment awarded to different offenders has been wisely exercised. It would recommend itself to most people that such an offender as a clergyman, who is imprisoned for not conforming to the rubric, should suffer less or no punishment beyond the deprivation of liberty, but a fraudulent bankrupt, or one who committed a criminal assault, or who incited others to crime and violence, is not necessarily a proper object for similar consideration on the ground of the character of prisoners in the class. Even crimes as grave as that of an ordinary typical criminal.

To pass from these special classes to the ordinary prisoners, the general rule is that after sentence every prisoner is permitted to raise himself progressively by industry, combined with good conduct, through four stages, in each of which he gains
some amelioration of his treatment. Commencing with penal or first-class hard labour—with sleeping on earls is laid from which there is no escape hard and with great restrictions as to books, letters, and visits—he gradually gains an improvement in each of these matters, and in each stage accumulates a small sum, larger in the higher stages than in the lower, which is either given him or laid out for his benefit out of a fund. When these punishments have, however, very largely diminished—a result of the system of progressive stages; for if ill-conducted or idle his progress into the higher stages is delayed, or he may be degraded into a lower stage after attaining to a higher. Considering the number of dietary punishments in 1877 (the last year before prisons were brought under the government) with the number in 1890, it is found that while the prison population has diminished by one-third, this form of punishment is less by one-half. Certain powers for the supervision of prison construction and expenditure are given to the governor, but corporal punishment or heavier sentences than he is empowered to award can only be inflicted by order of the magistrates who form the visiting committee of each prison, or by a commissioner. The various committees are appointed every year by quarter sessions, about twelve to each prison. Their duty is to visit the prison periodically, to hear any complaints of the prisoners, to deal with reports made of the misconduct of any prisoners, and to fulfil certain other functions more particularly the duties of the secretaries of State; but they have no authority over the officers. In fact, whereas up till 1878 the local authorities managed the prison, and the government inspected it, the position is now reversed, the government manages and the local justices inspect. A cardinal principle of the prison system is that every prisoner under sentence should be fully employed, but the description of employment varies in the different stages of the sentence. On first reception, and for a month at least, hard penal labour is enforced. Very few are employed to learn a trade, instead of being used as prison labour, according to their strength and capacity. The tread-wheel or crank is the typical form of this of first-class hard labour, as it is called; stone-breaking, oakum-picking, and some other forms of labour are enforced in the case of prisoners who are unfit for the tread-wheel. After this industrial labour is allowed, according to the capabilities of the prisoner, and forms a relief from the dull monotony of the first-class hard labour. A large proportion of the prisoners supply the wants of the prison population by weaving, tailoring, &c., and the list of trades followed or articles made in the prisons enumerated in the annual reports reaches to about 150; but, as may be imagined, there is a large number of prisoners who know of no industry which can be followed in a prison cell, and great industry is found in providing them with work, for they do not generally stop long enough to learn a trade to any good purpose. Mat-making and matting-weaving, which was, it is believed, introduced many years ago as a prison industry, is a trade which is very easily learned; but the same reason which recommends it for prison purposes makes it appropriate for many charitable institutions, such as blind schools, &c., and enables free persons who are incapacitated for other work to find employment at it. These latter are naturally anxious to diminish the competition of prison labour in their trade, though it forms now an exceedingly small part of that which they have to contend with, for the produce of machinery and imported and other foreign materials, besides the importation of rival materials to serve the same object, far exceeds the output from the labour of prisoners in this country. The number of prisoners employed in this industry has, however, by the efforts of the prison authorities, been diminished from nearly 8200 in 1874, which was the high-water mark, and because of the necessary conditions of prison labour, probably not more than that of one-fourth or one-fifth the same number of free labourers.

Every prison has its medical officer, and a well-regulated and well-constructed infirmary. The death-rate has decreased from 18 per 1000 to 8 per 1000 in prisons in England and Wales. The absence of all diseases due to insanitary conditions is the main reason of the healthy condition of the prisoners; and no doubt the strict temperance—for no alcoholic liquors form part of the dietary—and the regular life contribute to this result.

In order that the standard of efficiency may be maintained in all the prisons, and that opportunities may be given to both officers and prisoners to communicate any complaints they may have to make, reports from the district inspectors are made at least monthly, and to report to the commissioners on any point which may require their intervention. From the time when the prisons were taken over by the government in 1878 there has been a very large and almost uninterrupted diminution in the number of prisoners, who have been reduced by half due to any change of prison management, but there can be no doubt that this has had its share in the result, just as in former years bad prison management was a potent cause of the increase of crime.

The indication of the diminution of crime which is afforded by these prison statistics is fully corroborated by those which are derived from other sources. It is found that, during the fifteen years 1875-90, while the population has increased 25 per cent., the number of prisoners has decreased by about 12 per cent. In 1877 the total population was 23,465. In 1890 it was 19,677; and the decrease was all due to any change of prison management, but there can be no doubt that this has had its share in the result, just as in former years bad prison management was a potent cause of the increase of crime. Convictions for what is in ordinary language considered a crime—i.e. offences involving dishonesty, violence, &c.—increased in proportion with the population, has progressively diminished by about 12 per cent.; there were 283,000 convictions, summary and on indictment, for such crimes in 1873-74, and only 203,108 in 1887-88. Convictions for drunkenness are also much fewer—185,730 in 1873-74 and 166,306 in 1887-88; and if it were not for the increase in the number of commitments for offences against the education acts—for breach of bylaws and the like—the total number of commitments would have very largely diminished. The police reports show that the number of the criminal classes has diminished by about 62 per cent., and the number of disorderly houses has shown a corresponding diminution.

The design and construction of a prison is, as may be supposed, a feature of the very first importance. Security is of course one of the essentials, but there are others almost as important. In looking over old prisons one cannot but be struck with the massiveness of construction of many of them—the huge bars and bolts, the large clumsy locks, the ponderous grated doors, and, sometimes chained to the wall, the heavy fetters with which the prisoners were loaded. In the old

PRISONS 423
prisons

prison at York, built under the inspiration of the Rev. Sydney Smith, part of which still exists, security is provided for by making the walls of the cells of a rough stone, some 6 feet square and 2 or 3 feet thick, and grated windows of massive iron bars. In this modern construction the idea was intended to ensure the safe custody of the prisoners without constant personal watchfulness and supervision by the prison staff. All this is changed in the prisons of more recent date, but the security is even greater than before, because in a prison of modern construction the rooms are so made that it is impossible to isolate prisoners completely from each other. This construction has for some time been abandoned; it failed in its object, and in fact helped to prevent detection of an offender, while it was thought to diminish the influence of the minister and the effect of the service.

In connection with the offices is a library of selected books for issue to the prisoners, which is under the control of the chaplain. In some part of the cell block is a bath-house, where prisoners are required to wash themselves periodically; and in connection with the female side of the prison is a laundry for the washing of the prisoners’ clothing, sheets, &c., and in which also sometimes washing is done for people outside on payment. There are also workshops in which carpenters, smiths, &c., can work, and a foundry, where iron bars are cast for new gates. Large airy yards surround the blocks in which the prisoners live. In these they take their daily exercise under supervision of warders, pacing round and round a ring, separated by such an interval from each other as may prevent oral communication. Each yard contains of the dimensions of a large court, and is cultivated for vegetables for consumption by the prisoners.

Since 1869 a new feature has been developed in controlling the criminal class. By an act passed in that year and revised in 1871, the latter being called the Prevention of Crimes Act, any person convicted on indictment a second time may be subjected to ‘supervision’ by the police for seven years after the expiration of his sentence. During this period he is required to report himself to the police once a month, and to keep the errand of his residence; he is also required to prove his innocence if certain suspicious circumstances are brought against him. If he fails to comply with the obligation to report himself he may be imprisoned for a year with hard labour. The convict released conditionally before the termination of his sentence is under supervision or ‘probation’, and if there are reasonable grounds for believing that he is leading a criminal life, or showing himself unworthy of the freedom conditionally granted him, or if he should be actually convicted of crime, he may be returned to prison to undergo the whole of that part of his sentence which was remitted.

To aid in the work of detecting criminals an Habitual Criminal Register has been established, in which the names, descriptions, photographs, and criminal career of all persons who are proved to have been twice convicted on indictment are recorded. This register is printed and circulated to all police forces and prisons, and thus these authorities have at their command means of establishing the identification of any prisoner who comes into their custody, who is suspected to be an habitual criminal, and who may have been the subject of previous supervision or probation. The register contains information as to marks, or other remarkable personal peculiarities of those who have been registered, are classified and recorded.

It will readily be understood that it would not accord with the modern theory of punishment combined with reformation to turn any prisoner admitted at the prison gate on completing his sentence, to
seek for means of earning an honest livelihood with all the disadvantages which his connection and imprisonment obviously entail upon him. The first statutory recognition that it was right and expedient to make some provision for prisoners on discharge was in 32 Geo. III. chap. 45, by which justices might convey any such person by pass back to his parish; and at the opening of the chapter it declared a case for Mr. Michaelsec, the chaplain, the Rev. Samuel Glasse, pointed out that, the discipline and training of the prison having it might be hoped supplant the prisoners' habits of idleness and profligacy by habits of industry, the magistrates might be able to speak of them according to their merit or demerit to the parish officers. He observed, however, that this would not provide for the cases of Irish delinquents who had no settlement in the United Kingdom, but who were not few in number, as indeed they are not at this present day, when they furnish to British gaols an entirely disproportionate number of inmates. He thus showed the necessity for doing what in more recent times has been undertaken by societies for the aid of discharged prisoners. In 1823 the Gaol Act enabled a moderate sum of money to be paid for the benefit of discharged prisoners out of the returns of gratuities belonging to the gaol, in order that they might resort to any place of employment or honest occupation. In 1862 societies for the aid of discharged prisoners received statutory recognition, and the money awarded by the Gaol Act to the prison authorities, an amount not exceeding £2 per head, might be handed over to these societies for their benefit. This act was obviously a recognition of societies which already existed, but it afforded a great stimulus to the formation of others. The earliest of these societies is the list published by the Reformatory and Refuge Union, was the Hampshire Society, which dates from 1802; Dalston Female Refuge dates from 1803; the Sheriffs' Fund, which deals with City cases, from 1807. When the prisons were handed over to the government in 1878 there were about 50 discharging prisoners' aid societies acting in connection with the prisons, then 113 in number, and still numbering 66, even after the reduction which took place in the first two years.

The transfer of all prisons to the government in 1876 has had the most important effect in adding to the number of those societies. The Prisons Act had been passed partly to ensure uniformity of treatment of prisoners in all localities, and those who advocated the claims of the discharged prisoner were not slow to perceive that the same principle might be made to apply to the system of helping them to obtain honest employment on completion of their sentence; and, further, that the difficulty they had met with in inducing many of the local authorities to provide funds, or in raising private subscriptions, might be overcome, now that the government was responsible, because they were virtually bound to continue the grants which had been made by many local authorities, and could not refuse to make similar grants in places where the local authorities had hitherto failed to do so. In 1874—'The Prisons Act Union'—the Commissioners of Prisons took action with a view to securing the proper appropriation to this purpose of many charities and benefactions devoted in former times to the assistance of prisoners, but the exact objects of which were no longer applicable to existing circumstances. These funds were more or less within the cognisance of the Charity Commissioners, and some of the largest of them had already been diverted to objects quite disconnected from prisons or prisoners; but by means of an act passed in 1882 steps were taken by which most of these funds have been appropriated for the benefit of discharged prisoners through the agency of the above-named societies. The government makes to each society a grant each year proportioned to the number of prisoners to be relieved, in supplement of any of their charitable funds; but, as it is necessary to the object of the society and of its work that local aid and local interest should be excited in the work, it is essential that such aid should be a local one. For this purpose, the government has in each prison appointed a local committee, and in many, other organizations have more or less local connections. The grant is made on the principle that the sum should be at least equal in amount to the sum the government are prepared to allow. Besides the grant of money handed over directly to the society, the gratuity earned by a prisoner during his sentence may be paid him through the agency of the society, who thus have command over all the funds available for setting the prisoner out again in a fresh career, and can take care that it is not wasted in the indulgence to which a man or woman is naturally tempted on first release from the restraint and privation of prison life. The result of this government, this prominent position has there are now three societies in active operation in England, besides many homes and refuges chiefly devoted to helping women. There are nine discharged prisoners' aid societies in Scotland, and only three in Ireland. The result, of course, is that the statute statement of the results attained by these societies, but there can be no sort of doubt that they do admirable work. It is not, however, by any means those who spend most money who produce the best results. Money, no doubt, is an absolute necessity for the work, but the characteristic and important is personal care and interest in the person who has fallen into crime, perhaps from weakness of character, from bad bringing up, from misfortune, from evil connections, or whatever the cause may be, and who, after the experience of prison life and the disinterested aid has received, may desire to enter upon a new career.

United States.—In the early part of the 19th century the most advanced examples of prison discipline and construction were to be found in the United States, and although in the second half of the century this prominent position has no longer been maintained, the importance of the improvements initiated in America cannot be forgotten. Following closely on Howard's report, the 'Philadephia Society for Assisting Distressed Prisoners' was founded in 1770—the first of the kind in the world; and, though dissolved during the war, was reconstituted in 1787, and is still at work. Large measures of reform were quickly secured: by 1790 the principle of separation was recognised, and in 1794 all convicts were separated and sequestered; in the latter year, also, capital punishment was abolished in Pennsylvania for all crimes but murder in the first degree. It thus became necessary to devise some substitute for capital punishment. At the Eastern Penitentiary at Philadelphia, opened in 1829, the so-called Pennsylvania System of permanent seclusion of convicts was carried out; the evil effects arising from the rigorous application of this principle have been already referred to in this article, and even at Philadelphia the system is not now strictly enforced, whilst in all the other American prisons what is known as the 'Auburn System'—labor in association by day, and separation by night—has been adopted. In the southern states prisoners are leased out to the highest bidders for the term of their sentences; but this system, which confines the convicts to a slavery that is not modified even by considerations arising from personal ownership, is gradually being abandoned. The first place of detention for juvenile delinquents was opened at New York in 1825; the first reformatories on the cottage or family system were established in Ohio—for boys at Lancaster in 1838, for girls at Delaware in 1878.
In 1877 the Elminia (New York) Reformatory was opened, at which a new famous system has been adopted. It was opened to young men under thirty years of age; the principal features are indeterminate sentences, the classification of prisoners into three classes under the marks system, and discharge upon probationary parole, under supervision. The tasks are planned to avoid the evil effects of manual labour, and the plan has yielded good results, over four-fifths of the discharged inmates having been taught to lead useful lives.

A grave defect alleged by American critics is that in the county gaols and other places of detention for those awaiting trial all such prisoners are compelled to associate in a common hall, with all the evils which follow as a necessary result. It is said also that politics to a large extent determine the selection of prison officials, many of whom are appointed simply for services rendered to the party; and that the interference of labour organisations has had a considerable effect in the direction of putting a stop to contract labour—in New York, to labour of any kind—in the prisons. It may be added that crime has increased in the United States in a ratio far in advance of the growth of population; in 1830 the prisoners were 2,422; in 1850 they were 3,442 of the population; in 1880 they were 4,855. In a country where so many earnest and capable penologists are at work, however, there is every reason to hope for an ultimate return to better methods.

See the articles BEZARIA, BENHAM, CAPITAL PUNISHMENT, EXECUTION, FAIR, HOWARD, POLICE, REFORMATORIES, ROMILLY; those on crimes such as ARSON, ASSAULT, BURGLARY, MURDER, RAPE, THEFT, &c.; also works by such as Pike, History of Crime in England (1872-76); Barrow, Crimes and Punishments (1889); Perry, Prison Labour (Albany, 1868); Wines, The State of Prisons in the Civilized World (Cambridge, U.S., 1880); Havelock Ellis, The Criminal (1889); Punishment and the Prevention of Crime, by the present author (1885); Major A. Griffiths, Secrets of the Prison House (1893); the Bulletin de la Société Générale des Prisons; and German works by Holtzendorff and Jagemann (1893).

Priscend, a town of Albania, 72 miles E. by N. of Scutari, is one of the richest and most industrious towns in Turkey. Pop. 39,000.

Pristina, a town of European Turkey, 59 miles by rail N. of Uskub. Pop. 8000.

Prists. See SAWFISH.

Privateer, a ship owned by a private individual, which, under government permission, expressed by a Letter of Marque (q.v.), makes war upon the shipping of a hostile power. To make war upon an enemy without this commission, or upon the shipping of a nation not specified in it, is piracy. Privateering was abolished by mutual agreement among European nations, except Spain, by the Declaration of Paris in 1856; but the United States of America refused to sign the treaty, and have not acknowledged the article Paris (q.v.). It is doubtful, however, how far that abolition would stand in a general war, for privateering is the natural resource of a nation whose regular navy is too weak to make head against the maritime power of the enemy, especially if they offer the protection of wealthy commerce. It was usual for the country on whose behalf the privateer was carried on war to take security for their duty respecting the rights of neutrals and allies, and their observing generally the law of nations. While not considered Pirates (q.v.) by the law, they were regarded as a class upon which little better during the great wars at the end of the 18th and the beginning of the 19th century, and as a rule received but scant mercy at the hands of the regular services. In the wars of 1793-1814 many English privateers were afloat. But in the same period no less than 18,871 English ships, with over 2,000,000,000 of prize-money were taken by the privateers of all nations. In 1849 privateer Surcouf took, in two months of 1807, prizes worth £259,250. At the American Revolution the new republic fully realised the advantage of its position in preying on the mercantile marine of Great Britain; and in the last decade of 18th and first quarter of 19th century, when ships were licenced at 7s. annually at the hands of American privateers, of which it was computed that some 250 were afloat. During the American civil war the Confederate cruisers were at first regarded in the north as mere pirates; and the Alabama Claims originated in the charge against the United States of the departure of the privateer Alabama, licenced from British ports. In 1870 Prussia made a decree in favour of creating a 'volunteer navy.' See ENEMY, NEUTRALITY, ALABAMA, BUCCANEERS, CORSAIR, PIRACY, PRIZE, Norman, The Corsairs of France (1887); Gomer Williams, The Liverpool Privateers (1897).

Privet (Ligustrum), a genus of plants of the natural order Oleaceae, containing a number of species of shrubs and small trees with opposite leaves, which are simple and entire at the margin; the flowers small, white, and in terminal panicles; the calyx slightly 4-toothed; the corolla funnel-shaped and white; the stamens are staminate; there is no tube beyond the tube of the corolla; the berries 2-celled. Common Privet (L. vulgare) is a shrub growing in bushy places and about the borders of woods in the middle and south of Europe, and in some parts of North America. It has half-evergreen, smooth, lanceolate leaves; and berries about the size of peas, black, rarely white, yellow, or green. The flowers have a strong and sweetish smell; the leaves are mildly astringent, and were formerly used in medicine. The berries, which hang on the shrub during winter, have a disagreeable taste, but serve as food for many kinds of birds; they are used for dyeing red, and, with various additions, green, blue, and black. A rose-coloured pigment obtained from them is used for colouring maps. The wood is hard, and is used by turners, and by shoemakers for making wooden pegs. Privet, although not spiny, is much used for hedges, often mixed with some spiny shrub, or with beech. It bears clipping well, and grows well in the smoke of towns, also under the shade of trees. A number of species of privet are natives of different parts of the East, and resemble those of these northern shrubberies in Britain. Most kinds of privet grow readily from cuttings, but some of the more ornamental kinds are increased by grafting them upon the common or other more vigorous species. It has now been proved that the shrub the white wax insect of China contains the wax on L. Jwovum. See WAX INSECT.

Privilege. For the privileges of council, see BARRISTER; for the privileges of parliament, see PARLIAMENT; for those of peers and ambassadors, see NOBILITY, AMBASSADOR; for privileged communications, see CONFIDENTIALITY, LIBEL, for the sacredness of the confessional, see CONFIDENTIALITY, LIBEL, see also AURIST, DEBT, SANCTUARY, SOVEREIGN.

Privy-council. Wherever a feudal system of government has prevailed it has been customary for the sovereign to summon, from time to time, a counsell of his barons or nobles to advise him in matters of state. This practice was adopted by the English monarchs as the means of enforcing from powerful feudatories an acknowledgment of their sovereign rights. The attendance of a baron at the court of his lord was a tacit admission of the suzerainty of the latter.
Under the early English kings the royal council was styled the Audo or Curia Regis. It consisted of the Chancellor, the Justiciary, the Lord Treasurer, the Lord Steward, the Chamberlain, the Earl Marshal, the Constable, and any other person the king might appoint; and two archbishops belonged to it as of right; and the Comptroller of the Household, the Chancellor of the Exchequer, the Judges, and the King’s Serjeants were occasionally present at its meetings. The authority of the curia was originally connected with the king, in that the persons of government, judicial and administrative, were united; but its constitution gradually underwent a complete change. In the first place, a distinction came to be drawn between the body of the curia—the magnam concilium—the permanent committee of the curia, which was constantly and closely attached to the person of the king. Then the two councils were themselves subdivided. The Court ad sacramento, or Court of Exchequer, which sprang from the magnam concilium, took cognisance of affairs of finance, then of actions affecting the revenue, and lastly of civil suits generally. The Courts of King’s Bench and Common Pleas—descended from the magnam concilium—respectively acquired their separate and independent character (q.v.) and were accomplished by the end of the reign of King John. They were merely successive delegations of the royal authority, and left the king’s prerogative as the fountain of law unaffected. In spite, therefore, of the establishment of regular tribunals, the sovereign still continued to exercise judicial authority, if not personally, at least through the agency of his chancellor and of the council, whose jurisdictions, afterwards so clearly distinguishable, were originally united. In the time of Edward III., however, the Chancery was rapidly becoming a separate tribunal; and by the end of the reign of his successor its establishment as the great court of equity had been effectuated. The concilium assiduum, also, had become a separate assembly of royal officials, bound by a particular oath and paid a regular stipend, to whose duty it was to advice the king in questions of law and equity and from the magnam concilium, and regarded with no little jealousy by them both.

From the accession of Richard II. to the end of the reign of Henry VI., the Privy-council were not merely the servants but the ministers of the crown, and acted as a check upon the royal authority. While in theory the king could choose and dismiss the members of the council at his pleasure, the exercise of this prerogative was in fact subject to various restrictions. Some of the officers of the state were members of the council ex officio. The two archbishops claimed to belong to it as of right. The presence of other ecclesiastics, with whom the papal was a higher authority than the royal, introduced a further element of independence, and the occasional efforts of parliament to wrest the appointment of the chief justices from the hands of the council disapproved. The English sovereigns endeavoured to defeat the operation of this check by the use of a privy-seal, and by retaining the Great Seal in their own hands. But the privy-seal passed into the custody of the crown, and by the middle of the 14th century the council had succeeded in bringing every royal grant under its own notice at each stage in the procedure necessary for obtaining it. In the time of Henry V., the council assumed the name of Privy-council, by which it is now generally known. Its functions were then partly administrative and partly judicial. The former included the control of matters of finance, the establishment of staples—i.e. markets in which alone certain commodities could be exposed for sale—the regulation of the statutes which limited freedom of commerce between different parts of England, and the preservation of the peace. The latter cannot be better defined than in the words of Mr Hume, who has written that ‘it is perhaps one of the most difficult matters of legal authority or from want of the right disposition to carry their decisions into effect, the law courts were likely to prove inefficient, then the council stepped in by summoning before it defendants and accusers.

In the third or modern period of its history, which commenced when the Wars of the Roses were drawing to a close, the character of the Privy-council has undergone a variety of changes. The destruction of the feudal system, and the overthrow of the old ecclesiastical supremacy, reduced it to a position of absolute dependency on the crown. At the same time the power of the council as regards the people was greatly increased (1) by the subjection of particular places to its control—e.g. Ireland under Poyning’s Act (1494), and the Channel Islands; (2) by the exercise of the right to issue patents; (3) to the extent of the law courts under its supervision—e.g. the High Commission and the Court of Requests; and (4) by the extension of its judicial authority in the Court of Star-chamber (q.v.). The judicial powers of the Privy council were, however, restricted by the law courts in the 17th and 18th centuries its functions as the adviser of the crown in matters of government and state policy were gradually usurped by the Cabinet (q.v.).

Present Constitution and Functions.—The list of privy-councillors now includes the members of the royal family, the Archbishops of Canterbury and York, the Bishop of London, the great officers of state, the Lord Chancellor, the Lord Chief-justice of England, the Lords Justices of the Court of Appeal, the President of the Probate, Divorce, and Admiralty Courts, the Lord Keeper, and the Vice-president of the Board of Trade, the Paymaster of the Forces, &c., and necessarily all the members of the cabinet. Members of the council are in their collective capacity styled ‘His [or Her] Majesty’s Most Honourable Privy-councillors;’ individually each member is styled ‘Right Honourable.’ (The Lord Mayor of London, although styled ‘Most Honourable’, is not a privy-councillor. See Notes and Queries, first series, i. 496; iv. 9, 28, 137, 157, 180, 236, 284; i. 137, 138.) Under the authority of letters patent granting 24 March, 1681, the privy-councillors take precedence after Knights of the Garter. Amongst themselves they take rank according to seniority of appointment when no other principle of classification is applicable to the individual councillor. The privilege of appointment to the sovereign without either patent or grant, and are subject to removal at his discretion. By the common law, the Privy-council, as deriving its whole authority from the sovereign, was dissolved ipso facto upon the demise of the crown; but the act of 13 Anne, chapter 4, made that of having no council in being at the accession of a new prince, it was enacted (6 Anne, chap. 7, sect. 8) that the Privy-council shall continue for six months after the demise of the
crown, unless sooner determined by the successor of the deceased sovereign (cf. Stephen, Comment. vol. ii. p. 491). It is now understood that no members attend the deliberations of council except those who are specially summoned. In ordinary cases only the ministers, the great officers of the House of Lords, and the Lord Chancellor are, except on extraordinary occasions, summoned to the whole council. (Thus, on November 23, 1839, the whole of the Privy-council were summoned to Buckingham Palace to receive the parliament's answer to specific questions intended in the bill of Pains and Penalties, with Prince Albert.) Meetings of council are usually held at intervals of three or four weeks at the sovereign's residence; and six privy-councillors at least, with one of the clerks of council, constitute a meeting of council.

A privy-councillor must be a natural-born subject of Great Britain. His duties are defined by the oath of office as follows: (1) to advise the king to the best of his cunning and discretion; (2) to advise for the king's honour and good of the public, without partiality through affection, love, need, doubt or desire; (3) to keep the king's counsel secret; (4) to keep the council's secrets, and strengthen the execution of what shall be resolved; (6) to withstand all persons who would attempt the contrary; and (7) to observe, keep, and do all that a good and true councillor ought to do to his sovereign; and from long tradition of a member of the Privy-council was formerly safeguarded by several statutes repealed by 9 Geo. IV. cap. 31. Immediately on the decease of the sovereign the Privy-council assembles and proclaims his successor, the Lord Chancellor affixing the Great Seal to the proclamations, and the Archbishops of Canterbury and York are then sworn as council of the new sovereign, after which a privy-council is held, and the sovereign makes declaration of his designs for the good government of the realm, and subscribes the oaths.

The functions of the Privy-council in modern times depend on a great variety of statutes, and it is only possible here to give a brief and very general survey of the whole field. The subject is one full of confusion, partly because of the vast mass of detail which it involves, and partly because the long historical development which the Privy-council has undergone has given it a natural crush of legal notions, anomalies, and contradictions. It will be convenient to divide our observations under four heads:

(1) The Privy-council as synonymous with the Executive Government.—It is a commonplace of constitutional law that the cabinet, which is the organ of the executive government, is quite unknown to the law. In theory the cabinet is only a committee or inner circle of the Privy-council, and the Privy-council is still the only instrument through which the sovereign can exercise his prerogative. But the theory never corresponds with the facts; the power is exercised by the cabinet alone, and the Privy-council is never consulted. This is the sense which must be attached to the statements that the 'sovereign in council' has while authority in the colonies, can make and enforce all laws, and that the cabinet operates as a repre- sentative assemblies, and can allow or disallow the legislative acts of such as do possess them. The case is the same with orders in council relating to blockades, reprisals, or embargoes. And, in harmony with these expressions, it is the regular course in acts of parliament conferring specific powers on the executive government to confer them in terms on the 'sovereign in council.' In such cases the mention of the council is purely formal, and if the power is exercised it will be by the ordinary government (cf. also 13 and 14 Vict. cap. 59, sect. 50). It may be added that, as the executive power is thus dependent on the authority of the legislature, so no executive act can be done, and no order in council can be made, which an act of parliament cannot override.

This is now a recognised mode in which the legislature delegates defined legislative functions to the executive department, and the example that the Board of Trade, for example, can make regulations for carrying out the provisions of an act of parliament, though the act may simply state, 'It shall be lawful for Her Majesty by order in council' from time to time to make such regulations.

(2) The Privy-council as the depositary of State.—As the au clo regia was the mother of the acts of parliament, and of the various courts of law, so the Privy-council has given being, in quite recent times, to several administrative bodies (such, for instance, as the Board of Trade and the Local Government Board), to which many of its own administrative powers have been transferred. The different stages or methods in this process of differentiation are curious. The Board of Trade, established on its present basis in 1782, was at first, and still is in name, a committee of the Privy-council; it is defined in the Interpretation Act 12, as 'the Lords of the Committee for the time being of the Privy-council, appointed for the consideration of matters relating to trade and foreign plantations. But for all practical purposes it is a distinct department of state, controlled by a president, who is a member of the government. The Board of Health, created 1848, was ten years later superseded partly by the Home Office, partly by the Privy-council. In 1871 the Local Government Board was created, in succession to the Poor-law Board and any it were transferred many duties formerly exercised by the council in relation to the public health, such, for example, as the appointment and control of public medical officers and the carrying out of the Vaccination Acts. In 1889 a new Board of Agriculture was established, and took over the powers of the Privy-council in connection with the De-structive Insects Act and the Contagious Diseases (Animals) Acts. Neither the Local Government Board, nor the Poor-law Board (which, created in 1847, ceased to exist, as we have already mentioned, in 1871), nor the Board of Agriculture are the original committee of a cabinet, but in each case a portion of the administrative functions of the council was transferred to the new department, and the historical connection is illustrated by the fact that in all these cases the Lord President of the council is named first in the list of ex officio members. The Committee of Council on Education, established in 1839, remains in a different position. It has not been completely detached from the Privy-council and erected into a distinct department of the administration; and the member of the government who represents it is not the President of the council. It is virtually called the Education Department, and its complete detachment would require little more than a change in the designation of its chief, and a clear delimitation of the power and responsibility of the Lord President of the Privy-council and the President of the Council. The Vice-president of the Council is already virtually minister for education.

In 1885 the Secretary for Scotland Act further transferred to the new secretary the powers and duties of the Privy-council in connection with the affairs of the public life of Scotland so far as Scotland is concerned. The Secretary for Scotland was also entrusted with control over Scottish education, under the title of Vice-president of the Scotch Education Department, which is still nominally a standing committee of the Privy-council.
With regard to the administrative business which remains with the Privy Council as a separate department of state it is commonly denoted upon a general principle that the work is actually done by permanent government officials, under the control of the Lord President of the Council, who is responsible to parliament and to the country. It is believed that this is accurately so, even when special committees are appointed by act of parliament for special administrative purposes. That the members of such committees are little more than advisers results naturally from the modern doctrine of ministerial responsibility. With this limitation, committees of the Council usually exercise the same judicial powers as are vested in the Council, and the Council has power to consider, and to settle a scheme for adjusting the rights and liabilities of the existing local authority. Under the Medical Acts the Privy Council is entrusted with the supervision of the qualifications and the registration of medical practitioners; and kindred powers are conferred by the Pharmacy Act, 1868, and the Veterinary Surgeons Act, 1881. A Committee of the Council exercised these powers under the Pharmacy Act (see Education). A Universities Committee of the Privy Council was constituted for England in 1877, and for Scotland in 1889 (see Universities).

The style under which administrative duties are exercised on the Privy Council varies. Sometimes it is referred to the Council, and occasionally a clause is added that 'all powers vested in the Privy-council by this act may be exercised by an order in council made by two or more of the Lords and others of H.M. Most Honorable Privy-council' (Veterinary Surgeons Act, 1881, sect. 18). Sometimes the duty is laid upon 'the Lords and others of H.M. Most Honourable Privy-council, or any three or more of them of whom the Lord President of the Council, or one of H.M. principal secretaries of state for the time being, shall always be one' (9 and 10 Vict. chap. 96).

(3) The Privy-council in its widest Comprehension.

—The Privy-council, as a body, has in modern times no regular duties at all, administrative or judicial. Membership of it is a coveted honour, conferring rank, precedence, and titular dignity. It cannot, however, be described as a central administrative body: it is mere service, consisting of a large number of different members, who, when in office, have no administrative duties to perform. It has disappeared as an administrative body, but it still remains as an advisory council, and its contents are determined by the necessities of the public service. The advisory council of the Privy-council consists of the Lord President of the Council, the Lord Chancellor, the Lords Justices, and other members of the Privy-council at large as shall hold or shall have held certain judicial or other offices enumerated in the acts. By 34 and 35 Vict. cap. 91 Queen Victoria was empowered by order in council to appoint by warrant under her sign-manual four additional
paid judges, each being, or having been, a judge of one of the superior courts at Westminster or chief-justice of Bengal, Madras, or Bombay, to act upon the judicial committee. Under the Appellate Jurisdiction Act 1876 (sect. 14), provision was made purporting to authorize "the ordinary of appeal" for the four paid judges appointed under 34 and 35 Vict. chap. 91, and thus for the ultimate merging of the judicial committee in the House of Lords.

The conditions of appeal from colonial courts to the Privy-council, as now prescribed, sometimes in the charters of justice constituting such courts, sometimes by colonial acts, usually by orders in council. The customary conditions are that the amount at stake should exceed a certain sum in value, that leave to appeal should be asked from the court below within a certain time after the date of the judgment appealed against, and that proper security should be found. It is, however, the inherent prerogative right, and on proper occasions the duty, of the King or Queen in council to exercise an appellate jurisdiction over all colonial courts and in all civil matters extraneous. In the exercise of this jurisdiction, and in the absence of any charter or statutory right, the Sovereign in council may grant special leave to appeal in civil cases of substantial, general, or constitutional importance, where the judgment appealed against was passed in a colonial court and is final. In the absence of a charter or statutory right, the Sovereign in council may make rules for the regulation of the appellate jurisdiction of the Privy-council. The Privy-council is an exception to the general rule that the ultimate jurisdiction of the courts of justice is vested in the courts of the United States; and it is a constitutional question whether the appeal lies from the Privy-council to the courts of the United States.

The decisions of the judicial committee are pronounced by one member of the committee only, and not, according to the usual practice in divisional courts, the court of appeal, and the House of Lords, by each of the presiding judges. The student of the Privy-council reports is unable, therefore, to tell whether or not their lordships are unanimous, and, if not, who constitute the majority.

The Lord President of the Council is the fourth great officer of state, and is appointed by letters-patent in the Great Seal. The office is very ancient, and was revived by Charles II. in favour of the Earl of Shaftesbury in 1672.

Scotland once had a Privy-council of its own, but it was merged in that of England by 6 Anne, chap. 6. There is a separate Privy-council for Ireland, which in 1891 consisted of fifty-eight members, who are sworn pursuant to a sign-manual warrant directed to the Lord-lieutenant.

See Dicey's Privy-council (1880; new ed. 1887); Hearn's Government of England (ed. 1887); Macpherson's Practice (1860; new ed. 1873); Macquenie's Appellate Jurisdiction of (see Privy-council (1842); Conditions of Appeal from the Colonies to the Privy-council (1888); G. Wheeler, Privy-council Law (1894).

---

**Prize. Prize-money.** Property captured from an enemy; but the term is generally applied exclusively to property taken at sea. As between the belligerent powers themselves the property in a ship or other thing captured passes at once by the mere capture to the captor. Up to the close of the Crimean war all property of an enemy even when carried in a neutral ship was liable to capture. The property was that of a neutral if captured on board a belligerent ship. This involved a claim to the right of searching neutral ships, a claim which Britain was only able to enforce during the great war with France in consequence of her mastery of the sea; it was a right, however, which was continually being disputed, and the enforcement of it in the case of American ships led repeatedly to difficulties with the United States. When the treaty of Paris was signed in 1856 it was universally agreed that private property in neutral bottoms so long as it is not contraband of war shall no longer be liable to capture (see NEUTRALITY, ENEMY, BLOCKADE). Army-prize-money is distributed according to the provisions of the Army Prize Act of 1832; a list of those entitled to share being sent to Chelsea Hospital, whose treasurer makes the distribution. In naval cases, a claim must be made to a prize belonging to the capturing power, where the Court of Admiralty, on full evidence, adjudicates whether she be lawful prize or not. If the decision be affirmative the prize is then sold; or, if a ship-of-war, a certain allowance is granted by the state. The produce of the sale or grant is lodged in the hands of the Accountant-general of the Navy, for distribution to the officers and men who assisted at the capture. The net produce of the sale or grant is first divided ratably among any ships (if there be more than one) concerned in the capture. If hundred members of a flag-officer, he receives one-thirtieth part of the whole; the commanding officer then receives one-tenth part of the remainder, or of the whole if no flag is present; or, if there is more than one ship present, one-tenth part is divided between the commanding officers. After provision has been made for the flag (if any) and for the portion of the commanding officer or officers, the remainder of the proceeds is so distributed that each officer, man, and boy shall receive shares or a share: commanders and officers of similar rank receive forty-five shares each; lieutenants and officers of similar rank, from forty shares to thirty according to seniority; sub-officers, petty officers, petty officers, ten shares; first-class petty officers, ten shares; second-class petty officers, seven shares; able seamen, four shares; ordinary seamen, two shares; and boys, one share each. Warburton's Prince Rupert (vol. iii.) gives an interesting distribution of prize-money in the 17th century.

**Prize-court.** See ADMIRALTY COURTS.

**Prize-fighting.** See PUGILISM.

**Prjevalski.** See Prjevalski.

**Proa** (Malay praku), sometimes known as the 'flying proa,' is a peculiarly shaped canoe in use by the natives of the Malay Archipelago, and on the China Seas, especially by the Ladrone Islanders. It is about 30 feet in length by 3 in width, and has the stem and stern equally sharp, so as to sail backward or forward with but little being turned round. One side is flat, and in a straight line with the stem and stern; the other side is rounded, as in ordinary boats. This peculiar formation would make it liable to easily upset, were it not for a framework which projects...
to windward, supporting a weight which balances the pressure of the wind on the sail. The sail resembles the ordinary lug-sail, and is formed of mat. Slight variations from this form are found, but the principle of construction is the same.

Probabilism. See Casuistry.

Probabilities, Chances, or the Theory of Averages. To assign a number which measures the probability of a future event may at first seem impossible; and yet the whole business of many large empires instituted in every civilized country for the ‘insurance’ or ‘assurance’ of lives, &c. is mainly based upon the methods of assigning such a number. When it is certain that a future event will take place, or will not take place, a fixed number is selected for each case to indicate that then either happen or fail, the sum of the two probabilities are the limits of our scale. Will the sun rise to-morrow morning in the east? Probability = 1, certainty in favour. Will full moon be seen to-morrow morning in the east? Probability = 0, certainty against. Between these two limiting numbers, and, in fact, is the probability (or fraction) which measures the probability of any undecided event. The number, then, by which we mark the chance, or expectation, or probability of anything occurring in the future, must be a fraction like \( \frac{1}{2} \), \( \frac{2}{3} \), \( \frac{4}{5} \), or 273, and can never be so large as 1, which was fixed as the higher limit, certainty; and by the fractional number assigned to any event we can readily compare its probability with those of other future occurrences.

To assign the proper fraction to any future event we will, in general, imply knowledge of a large number of similar events. Thus, in January, what is the probability that on next 12th April the sun will rise bright and unclouded? Relying on the constancy of nature and the doctrine of averages, we consult the calendars and weather-notices of the last 50 years, say, and find that in 17 of these the result was favourable and in 33 unfavourable. On these data the probability required is \( \frac{17}{50} \), rather over \( \frac{1}{2} \). In other words, the odds are nearly 2 to 1 against the event. The fraction \( \frac{17}{50} \) measures or shows the probability that the event will not happen. More generally, if an event may occur in 12 ways and fail in 15 ways, then the probability of its occurring is \( \frac{12}{27} \) and the probability of failure, \( \frac{15}{27} \). In such a case the 27 ways are supposed to have each the same chance of occurrence; and, since the event must either happen or fail, the sum of the two probabilities =certainty—i.e. \( \frac{12}{27} + \frac{15}{27} = 1 \). Thus, if \( \frac{12}{27} \) is the chance of an event, \( 1 - \frac{12}{27} \) = chance that it will not occur. In a certain town only 4 days of May—taking the average of many years—are rainless; what will be our chance of finding next 15th May rainless? Chance \( \frac{4}{29} \) = chance of rain falling. The principle involved in such simple solutions is the foundation of the mathematical treatment of chance or probability. Of all the occurrences, all equally possible, which relate to a future event, if \( a \) are favourable and \( z \) unfavourable, then \( p = \frac{a}{a + z} \), where \( \frac{a}{a + z} \) stands for probability of the event occurring. Sometimes it is easier to find the probability of the event failing, and subtract that result from 1 as in the examples just given.

Out of 100 sailors who mutinied there were 10 ringleaders. If 2 are selected by lottery for capital punishment, find the chance that both will be ringleaders. The total number of pairs is 100.99 and the number of pairs among the ringleaders is 10.9. Hence chance required = \( \frac{10.9}{100.99} \) = \( \frac{10}{100} \).

The number of the 9 coins is 6, 8, 7 or 84, which forms our denominator. Of the sovereigns there are 1.2 = 10 pairs, each of which may be drawn with one of the 4 shillings, giving 40 groups of 3, which forms our numerator. Hence chance required is \( \frac{6}{10} \) = \( \frac{3}{5} \); i.e. the odds are 11 to 10 against the event.

Sometimes actual trial seems to throw discredit on the mathematical measure of a chance. Thus, if a die be thrown, the chance of a 5 or any other number turning up must be \( \frac{1}{6} \) by our definition; whereas a person may cast a die, say 20 times in succession, with the result: 6 four times; 4 and 6 each 3 times; 2 and 3, each 5 times; 5 not at all. How then explain the mathematical estimate? Simply that 20 is much too small a number to take an average from, and the result 'chance = \( \frac{1}{6} \) for each side of the die' refers to the most general case and is not applicable for an indefinite number of throws. Register for 10,000 throws, then for 100,000 or 1,000,000, and the results would more and more approximate to the mathematical result, and prove that each side has chance = \( \frac{1}{6} \)—the die being of course a perfect cube.

An important extension of the theory is that the probability of two independent events both occurring is measured by the product of their separate probabilities. Thus, if A’s chance of passing a certain examination is \( \frac{1}{4} \) and B’s \( \frac{3}{4} \), then (1) the chance that both will pass is \( \frac{1}{4} \times \frac{3}{4} \), i.e. the odds are 7 to 5 against; (2) the chance that both will fail is \( (1 - \frac{1}{4}) \times (1 - \frac{3}{4}) \); (3) the chance that A passes and B fails is \( \frac{1}{4} \times \frac{1}{4} \); and (4) the chance that A fails and B passes is \( (1 - \frac{1}{4}) \times \frac{3}{4} \). By comparing these four results we see that the last event is the most probable of all, the odds being 25 to 24 in favour of it. Moreover, these results exhaust the possible alternatives of double event, therefore the four probabilities should together amount to certainty: \( \frac{1}{4} + \frac{3}{4} + \frac{3}{4} + \frac{1}{4} = 1 \).

By the same principle we solve many useful and curious problems. A town-council of 20, 12 Liberals and 8 Conservatives, have to choose a deputation of 5 by ballot; find the probability that it will contain 3 Liberals and 2 Conservatives. Total number of groups of 5 is 20.19.18.17.16 = 1.2.3.4.5. and 19.3.17.16, which forms our denominator. Number of groups of 3 from the Liberals is 12.11.10, or 2.11.10, and number of pairs of the Conservatives is 8.7 or 4.7; therefore multiplyings 2.11.10.4.7 = total number of groups of 5 which fulfill the conditions; and required probability is \( \frac{1}{2} \times \frac{3}{4} \times \frac{1}{2} \times \frac{3}{4} \times \frac{1}{2} \) in other words, the odds are 354 to 385 or more than 3 to 2 against the event.

When a person buys lottery tickets his chance of success is found as in our opening paragraphs, and if multiplied by the value of the money attainable the product is called his 'expectation.' In this connection may be noted an important distinction
between the moral and mathematical values of 'expectation,' owing to the assumption that in such speculations the loss of money paid for tickets is not to be regarded. If one man of moderate means risks £500 in order to gain £5 when the odds are 100 to 1 in his favour, and another risks £25 to gain £500 when the odds are 100 to 1 against, the speculation in the former case appears much more reckless and immoral than in the latter, although in both cases the stake is exactly equal to the expectation.

We now reach the most important of all the applications of the theory of probability, its use in the calculation of life insurances and annuities. During the early part of the 18th century the celebrated London mathematician De Moivre constructed a formula of great simplicity which is still available, although largely superseded by elaborate 'tables of mortality' which have since been compiled in all commercial countries. De Moivre's hypothesis, out of 86 children born at the same time dies every year until all are extinct. Thus, for a man 40 years old, 86 − 40 = 46, 46 years on an average are still before him and 45 others; and his chance of life is the average number between 0 and 46, i.e., $\frac{46}{2} = 23$. Generally a person's probability of life or expectation is $\frac{b}{a+b}$, where $b$ is the present age. Actuarial writers have found that this simple formula agrees with their official tables, except in the case of young children and aged persons. The tables are based upon long-continued observations of the mortality in the class of persons dealt with, and from them the theory of probability is easily applied in calculating annuities, reversionary payments, and other results.

For ascertaining the various life contingencies the Institute of Actuaries employ a table giving all the ages from 10 upwards, and, beginning with 100,000 persons alive at the age of 10, place opposite each succeeding age the number of survivors, till at 98 years none are left. At 40, survivors = 82,254; at 50, survivors = 72,726; therefore the chance that a man of 40 shall live to 50 is 72,726 ÷ 82,254 = .884. The Belgian tables give .832 for the same event in the case of a married man living in town; and if his wife is 30 years old her chance of surviving for ten years is .802. These data give the following calculation of the chances of the four double events occurring 10 years hence:

- Both alive = .832 x .802 = .671
- Both dead = (1 − .832) x (1 − .802) = .223
- Husband alive only = .832 x (1 − .802) = .115
- Wife alive only = (1 − .832) x .802 = .145

As we have seen already the sum of these four probabilities must = 1, which verifies the reckoning.

The chance of both these persons being alive is evidently more than $\frac{1}{2}$—i.e. the odds in favour are better than 7 to 3.

Some of the higher applications of the doctrine of probability are not at all known, and the integral calculus and are of interest only to experts. It is proved, for example, by integration and the theory of averages that the mean latitude of all places north of the equator is 32°704; and when four points in the circumference of any circle (radius $r$) are taken at random, the mean area of the quadrilateral so determined is $3r^2 \pi = 935.5$.

There are works on the subject by De Morgan (1837), Boole (1854), Todhunter (1865), Venn (1866), Whitworth (1886), and Froster (1887).

**Probange**, an instrument of various shape and material, for pushing obstructions down the esophagus of a choking animal. See Choking.

**Probate Court**, a court created in England in 1838, in lieu of the old Prerogative Courts, to exercise jurisdiction in matters touching the succession to personal estate. Since the Judicature Acts of 1873-75 the Probate Court is included in the Prerogative, Divorce, and Admiralty Division of the High Court of Justice. If a man at his death leaves a will, then it must be produced and verified so as to prove that it is an authentic will, duly executed and signed in presence of witnesses, and therefore that the right to the personal estate is vested in the executors named by the will. The will is proved in eausin form by depositing it in one of the registries of the court, by making affidavit of the amount of the property, and by paying the probate duty (varying from £1 per £50 to £2 per £100, according to the amount of the property). The executors receive a copy of the will, accompanied by a grant of administration; and this probate copy is usually shown to bankers, &c., when the executors lay claim to the property of the deceased. If the authenticity of the will is disputed it must be proved by witnesses in court. If there is no will the personal estate devolves on the next of kin and widow, if any; and it is necessary that an application be made to the court to appoint an administrator. This is called taking out administration, and the act of the court appointing administrators is called letters of administration. See Dixon on *Probate* (2d ed. 1889).

**Probationer**, one who is on probation; especially, in Scotland, a divinity student who, having completed his studies and performed the prescribed exercises, is licensed to preach by the presbytery, and is entitled to become a candidate for a pastoral charge.


**Proboscis Monkey** (*Nasalis larvatus*), a native of Borneo, one of the dog-like (Cynomorph) Catarinesse, nearly allied to the genus Semnopithecus. The nose is very long, especially in the old males, and is mobile and retracted like a proboscis. In the young monkeys it is short and blunt. There are bushy whiskers, which, with the long hair on the back of the head, encircle the neck. The colours—brown, red, yellow, and gray—are bright. The adult males are about 3 feet in height; the body is lank, and the tail is very long. In habit these animals are arboreal and gregarious.

**Probos**, MARCUS AURELIUS, emperor of Rome, was born at Sirmium, in Pannonia, early entered the army, and the great fortune to attract the favourable notice of the Emperor Valerian. His subsequent conduct justified his rapid promotion, for he greatly distinguished himself on the Danube, and in Africa, Egypt, Asia, Germany, and Gaul. By the Emperor Tacitus he was appointed governor
of the Asiatic possessions of Rome; and such was the zealous attachment evinced for him by his soldiers, that on March 19th, three days after, they forced him to assume the purple; and, his rival Florians having been removed, Probus was enthusiastically hailed emperor by all classes (276 A.D.). His brief reign was signalized by brilliant and important successes; the Germans were driven out of Gaul, and the Persians, from the Rhodian, Panonian, and Thracian frontiers; and Persia was forced to agree to a humiliating peace. The external security of the empire being established, Probus devoted himself to the development of its internal resources. But fearing that the discipline of the army would be deteriorated by inactivity, he employed the soldiers as labourers in executing various extensive and important works of public utility. Such occupations, considered as degrading by the soldiers, excited among them the utmost irritation and discontent; and a large body of troops engaged in draining the vast expanse of Sirmium murdered their excellent emperor in 282.


Processions, as solemn and religious rites, are of very great antiquity. With the Greeks and Romans they took place chiefly on the festivals of Diana, Bacchus, Ceres, and other deities; also before religious images of the God, as, for instance, the Circumcision, and in spring, when the fields were sprinkled with holy water, to increase their fertility. The priests went at their head, bearing images of the gods and goddesses to be propitiated, and started either from certain temples or from the Capitol. Among the Jews these processions were carried on in winter and still are at a certain extent—usual on the Feast of the Tabernacles; and from thence the Mohammedans have adopted their mode of encompassing the sanctuary seven times at Mecca. Processions also form a prominent part of the Buddhist worship. The practice was early introduced into the Christian church, but seems to have been adopted by Chrysostom at Constantinople to counteract the influence of the Arians processions through the streets to their churches outside the walls. As soon as images of them as ancient in his day. During the middle ages processions were arranged on a scale of great magnificence, as at the Corpus Christi Festival. Since the Reformation they have been much less elaborate, especially in mixed countries; but at Vienna, and still more at Munich, the Corpus Christi procession is still magnificent. Processions are either Suppliatory processions or Cross processions, and are either directed to a certain distant place, to some miraculous image or object, or they are confined to the streets of the cities and the churches. Banners, crosses, and images are generally carried in front; the clergy follow; and the people make up the rear, singing hymns or reciting prayers. Processions to beseech the special mercy of God are variously to be described as Litanies, Lamentations, Supplications, a. Exordia; and again, they are to be distinguished by being used with or without the Blessed Sacrament, relics, or images of the Virgin or Saints. Some are extraordinary and specially arranged; others are ordinary and fall under the common ritual, as those on Candlemas, Palm Sunday, St. Mark's Day, three Rogation days, and at funerals. The Processional is the service-book containing the prayers, hymns, and ceremonial of processions. There is no doubt that, whatever their general intrinsic value, they offer in many instances one of the most strikingly picturesque features of the Roman faith, and that they answer a certain instinctive craving of the multitude. Processions through the streets are frequent in modern life as political and social demonstrations, as during strikes and the like, and when not deemed dangerous to order or obstructive to traffic, are claimed as a privilege of free-born citizens; and they have been introduced to break the quiet of many English towns and villages as part of the traditional ceremonies of the Salvation Army. For extensive pilgrimages, see Pilgrim, Mecca, Festivals, &c.

Procehin Ani. See Infancy.

Procida, an islet of Italy, between the island of Ischia and the mainland (Cape Miseno), 50 miles W. by S. of Naples. Area, 1} sq. m.; pop. 18,131. On its shores is the city of the same name, with a harbour, a royal palace, a state-prison, and a marine school. The people fish coral, tunny, and sardines, and grow fruits, wine, and oil. The island was occupied by Britain on two or three occasions between 1799 and 1813.

Proclamation, a public notice given by the sovereign or governing power to the people. The power of the sovereign to proclaim a Habeas Corpus act and to proscribe the pro-revolutionary party is necessary in order to suppress the influence of royalty as the fountain of justice. They sometimes consist of an authoritative announcement of some matter of state, or act of the executive government affecting the duties and obligations of subjects. The demise of the crown, and accession of a new sovereign, such declarations of the government that the new coin is all occasions on which a royal proclamation is issued. In time of war, the crown by a proclamation may lay an embargo on shipping, and order the ports to be shut. But the most usual class of proclamations are admonitory notices for the prevention of offences. Such proclamations are declarations of existing laws and penalties, and of the intention to enforce them; such as the proclamation against vice and immorality, formerly read at the opening of courts of assize and quarter sessions in England. In Scotland proclamations summon the Scottish peers to elect representatives to the House of Lords.

Proclamations are binding when they enforce the execution of laws already in being. Towards the end of Henry VIII.'s reign it was enacted that the King's proclamation should be deemed an act of parliament; but this ill-judged law was repealed in the first year of Edward VI. It is now clear that the sovereign can neither make a new law, nor dispense with the existing law, unless by consent of parliament. A meeting which is proclaimed is not thereby rendered illegal; the proclamation is only a notice that, in the opinion of the government, the meeting is likely or certain to assume an illegal character. Proclamations are issued under the Great Seal, and are read aloud by heralds or other royal officers, in the three equal cities of the United Kingdom; the reading is preceded with the cry of 'O yes' (Fr. oyez, 'hear').

Proclus, the Neoplatonist, called the Successor (Diodococh), i.e. of Syrius, as the head of the Athenian school, was born in Constantinople about 411 A.D. He was of Lycean origin, and received his first instruction at Xanthus, in Lydia. He then studied at Alexandria under Arion, Leonaras, Hero, and especially under Heliodorus, with whom he applied himself chiefly to Aristotelian and Platonistic philosophy. From thence he went to Athens, where a certain Plutarch, a philosopher, and his rival, Socrates, met him and the latter, priest of Elenus, became his instructors, chiefly in theurgic mysteries. The vivid imagination and enthusiastic temperament which in his childhood already had led him to believe in apparitions of Minerva and Apollo, naturally convinced him, when all the influences of the mysteries were brought to bear 392
upon him, still more of his immediate and direct intercommunication with the gods; and he came to be—in the words of Procopius—that "the last and highest links in the ancient chain of the Heraclian sect, through which divine revelation reaches mankind." His soul had, he thought, once lived in Nicanor the Pythagorean, and, like him, he had the power to command the elements to a certain extent, to produce rain, and to temper the sun's heat. Of the Orphic Poems, the writings of Hermes, and all the mystical literature of that occult age were to him the only source of true philosophy, and he considered them all more or less in the light of divine revelations.

That same cosmopolitan spirit in religious matters which so characterized the period still had spirit in all the civilised pagan world of those days, and Procopius distinctly laid it down as an axiom that a true philosopher must also be a hierophant of the whole world. Acquainted with all the creeds and rites of the ancient pantheons of the different nations, he not only philosophised upon them in an allegorising and symbolising spirit, as many of his contemporaries did, but practised all the ceremonies, however hard and painful. Most especially was this the case in the severity of his fasting in honour of Egyptian deities—a practice which, it fitted him more and more for his hallucinations and dreams of divine intercourse, on the other hand more than once endangered his life. Of an impulsive piety, and eager to win disciples from Christianity itself, he made himself obnoxious to the Christian authorities in Athens, who, in accordance with the spirit of religious intolerance and fanaticism which then began to animate the new and successful religion against which Proclus waged constant war, banished him from this city. Allowed to return, he set out with somewhat more prudence and circumspection, and only allowed his most approved disciples to take part in the nightly assemblies in which he propounded his doctrines.

He died in 485, in his full vigour, and in the entire possession of all those mental powers, for which he was so celebrated, and so resembles to his personal beauty and strength.

As to his system, some modern philosophers have exalted it to an extent which his own writings scarcely warrant. Victor Cousin holds that he has concentrated in it all the philosophical rays which emanated from the great philosophers of the Greek world, such as Pythagoras, Plato, and Aristotle. The predominant law of development is triadic in character. The existence of what is produced in that which produces it, its emergence from it, and its return to it (μονή, πλούσιον, κτισμόν) are the three moments, by the continued repetition of which the totality of things is developed from their origin. The final source of this development is the original essence, elevated above all being and knowledge, between which and the intelligible there intervenes an intermediary member—the absolute unities (αὐτοτελή ἐντολά), together forming the five ultimate numbers, the basic elements on which he builds, the three spheres of the intelligible, the intellectual—intelligible (νοητά ἔθα καὶ νοημένα), and the intellectual. The chief property of the first is being; of the second, life; of the third, thought. Of these three parts, the first and second are again divided (3:2:1), the first into four triads, each of which is divided into two hemiologies, and each separate member regarded as a divinity. The soul is made of three kinds of parts—divine, demonic, and human. Of these the divine fall into three orders: the four triads of hegemonic gods, an equal number of gods free from the male, and the gods divided into four unities of the world, who are divided into stars-gods and elementary gods. The demons are divided into angels, demons proper, and heroes. The soul enters temporarily into the material body, but it does not create matter, which comes directly from the unlimited—without the limited and hence from the outside of the first intelligible triads. Space he considers as a body consisting of the finest light, which body penetrates that of the world. He distinguishes the principle of unity or divinity in the soul from thought or reason. It is capable by divine presence and illumination to manifest itself, to manifest the existence of God. Indeed, faith alone is essential to the attainment of Theurgy, which, comprising mental and supernatural inspiration, is preferable to all human wisdom; and in this Proclus chiefly differs from Plotinus, with whose system he agrees in most other respects.

There is no edition of the complete works of Proclus, but that of Victor Cousin (6 vols. 8vo, Paris, 1820) contains the Commentaries on the First Aeletheias and the Carmenides, and the treatises De Libraria, Procrustianst, et Malo (in a Latin translation); his second edition (1 vol. 4to, 1864) contains in addition to these the Homnms. Thomas Taylor, "The Platonists," published in 1788-89 translations of the Commentary on Evelius, with the life of Proclus by Nicomachus the Six Days, 1816; the Commentaries on the Timaeus in 1820; the Fragments on the Last Writings in 1825; On Providence, and On Evil, in 1833. The Commentaries in Plato's Dialogues, published by A. E. Taylor, 1833, is the one among his treatises that Proclus esteemed most highly. See Zeller's Philos. der Griechen (3d ed., 1881, ii. 2), and other books named under NEOPLATOMISM.

Procopius, a Roman magistrate not holding the consuls, who was invested with powers nearly approaching those of a consul, not, however, extending over the city and the camp. Procopius was, at first, one who had held the office of consul, whose imperium was prolonged to enable him to bring an unfinished campaign to a close. The duration of the office was a year. During the later period of the republic, when the consuls were expected to lead the army in the field, at Rome, they were generally appointed at its close to undertake, as consuls, either the conduct of a war in some province, or its peaceful administration. Occasionally the office of consul, with the government of a province, was conferred upon a man who had held the consuls. Under Constantine parts of certain dioceses came to be governed by consuls.

Procopius, ANDREW, the Hussite leader, was born in 1380. Originally a monk, he served under Ziska, and on Ziska's death became commander of the Taborites. It was under his command that the fearful raids into Silesia, Saxony, and Franconia were carried out (see HUSSITES), and he repeatedly defeated German armies. He and his colleague, Procop the Younger, headed the internal conflict of the Taborites with the more moderate Calixtines; and in the battle with the Bohemian nobles at Lipin, near Böhmenbruech, on the 30th May 1434, both the Taborite commanders fell.

Procopius, the most eminent of the Byzantine historians, was born at Cassarea, in Palestine, towards the close of the 5th century, and, having studied law, was taken by Belisarius in his train when he led the Roman armies against the Persians (526 n.c.), the Vandals in Africa (533), and the Ostrogoths of the east (536). His works displayed remarkable practical as well as literary talent, for he was on two occasions placed at the head of the commissariat. Returning to Constantinople shortly before 542, he was highly honoured by Justinian, and appointed prefect (if it was this Procopius who was in office). When Justinian died, he is thought, about three years later. Procopius's principal works are his Historiae in eight books (two on the Persian war, from 468 to 550; two on the war with the Vandals, from 532 to
546; and four on the Gothic war, going down to 552; De Adhesionis, or six books on the buildings executed or restored by Justinian; and Anekdoten, or Historia Arcana, a sort of chronicum scandalum of the Byzantines, in which he displays his usual acumen, error, his wife Theodora, Belisarins, his wife Antonina, and other distinguished persons, are depicted in the darkest colours. The most valuable of these productions is undoubtedly the first, in which Procopius writes with the clearness and fullness of knowledge that might be expected from a man who had been an eye-witness of much of what he narrates, and who had occupied a position that fitted him to thoroughly understand what he had seen. He is the principal authority for the reign of Justinian. The best edition of his complete works is that by Dimorfóte (1832-38). See Dahn, Proskopios von Kaisarea (1866); a work by Renan, Essais de Morale (3d ed. 1867); Haury, Procopianis (1891).

**Procrustes** (Gr. Prokroustis; from prokrouein, 'to beat out,' 'to stretch out'), the surname of a celebrated robber of Attica, named Damastes, or Polydamastes. He fell in love with a woman who lay on a bed which was either too long or too short for them, but to which he adjusted them either by racking or by amputation till they died. This he continued to do until Theseus overpowered him, and made him suffer the tortures he had inflicted on others.

**Procto**, BRYAN WALLER ("Barry Cornwall") was born in London, 21t November 1787. Educated at Harrow, with Byron and Peel for schoolfellows, he was articled to a solicitor at Calne, about 1807 came to London to live, and in 1815 began to contribute to poetry the Literary Gazette. In 1816 he succeeded by his father's death to about £500 a year, and in 1823 married Basil Montagu's stepdaughter, Anne Benson Skepper (1799-1888). He had meanwhile published four volumes of poems, and produced a tragedy at Covent Garden, whose success was largely due to the acting of Macready and Kemble. He was called to the bar in 1834, from 1832 to 1861 was a metropolitan commissioner of lunacy, and died 4th October 1874. His works, issued under the pseudonym "Barry Cornwall" (a faulty anagram of his real name), comprise Dorothea (1820), The Vicissitudes of Life, and Marcian Colonna (1821), The Flood of Thessaly (1823), and English Songs (1832), besides memoirs of Kean (1835) and Charles Lamb (1860). The last is always worth reading; but his poems may be safely neglected by the student of poetry, for they rarely are more than studied if graceful exercises, harmonious echoes of bygone and contemporary singers; in Mr Goss's words, 'his lyrics do not possess passion or real pathos or any very deep magic of melody, but he has written more songs that deserve the comparative praise of good than any other modern writer except Shelley and Tennyson.' Yet "Barry Cornwall" will be remembered as the man whom every one loved—that every one including a hundred of the greatest of the century: Lamb, Wordsworth, Coleridge, Leigh Hunt, Kenyon, Southey, Byron, Browning, Matthew Arnold, Swinburne, Hazlitt, Macaulay, Carlyle, Dickens, and Thackeray were only a few of his numberless friends and acquaintances. See Bryan Walter Proctor: an Autobiographical Fragment (1871), edited by G. Gayley. Palmore in an article therein the Edinburgh Review, April 1879, the critical introduction by Mr Goss in Ward's English Poets (2d ed. 1883); and a long obituary of Mrs Proctor in the Academy for 17th March 1888.

**Proctor**. Barry Cornwall's daughter, was born in London, 30th October 1825, and died there 3rd February 1864, having in 1851 become a Roman Catholic. By her Legends and Lyrics (1858-60), first written some of them for Household Words, she won no small poetical renown.

**Proctor**, or Procurator, one who acts for another. This name was formerly given to a class of practitioners in the English Admiralty and Ecclesiastical courts; but now is used for almost all purposes in the general body of solicitors. The King's or Queen's Proctor is an officer (now the Solicitor to the Treasury) who intervenes to oppose a petition for divorce if he has reason to suspect fraud or collusion. The clergy appoint proctors to represent them in the convocation of their province.

In each of the universities of Oxford and Cambridge there are two proctors, whose duties are to preserve the peace of the university, to repress disorders among the students, and inflict summary academical punishment. They have the command of the academical constabulary, and have also an extensive police jurisdiction in the town. They patrol the streets after dark, attended by officers popularly known as 'bull-dogs.' The proctors must be at term at Oxford and Cambridge, elected by the colleges according to a certain rotation. They nominate two pro-proctors to be their deputies and assistants. The summary authority of the proctors extends both to undergraduates and Bachelors of Arts. They vote in the election of some of the University officers, and in Durham also there are two proctors, who, however, do not personally patrol the streets, and have command over only the university police.

**Proctor**, RICHARD ANTHONY, astronomer and popular author, was born at Chelsea in March 1834. He was educated first at King's College, London, and then at St John's, Cambridge, where, however, he devoted himself chiefly to athletics. He graduated in 1860 as twenty-third wrangler. His first literary venture was, in 1865, an article on 'Double Stars' in the Cornhill Magazine, and from that time he devoted himself to astronomy. In 1866 he was elected an F.R.A.S., and in 1872 its honorary secretary, but he retired in 1873 to make a lecturing tour in America. About this time he communicated to the R.A.S. some important papers on The Construction of the Milky Way, 'The Transit of Venus,' 'Star Distribution,' &c.; and his name is associated with the accurate determination of the rotation of the planet Mars, and with the theory of the solar corona. One of his undertakings was the charting of the 324,198 stars contained in Argelander's great catalogue. His science magazine Knowledge was founded as a weekly in 1881, and became a monthly in 1885. He died at New York, September 12, 1888. He was a man of untiring energy, and, although the author of fifty-seven books, he found time to cultivate music, and was a great chess and whist player.

As an author and lecturer he succeeded in interesting in astronomy a large public in America and the colonies as well as in England. In 1890-91 a memorial teaching observatory was erected in his honour near San Diego, California.

Among his works are Surveys of its System (1865), Handbook of the Stars (1868), The Constellations (1867), Half-hours with the Telescope (1868), Other Worlds than Ours (1870), Star Atlas (1870), Light and Darkness for Language (1871), The Sun (1872), The Earth (1872), Orbs around Us (1872), Essays on Astronomy (1872), The Expanse of Heaven (1873), The Moon (1873), The Borderland of Science (1873), The Universe and the Container (1874), The Poor Place in the Universe (1874), Love and the Universe (1874), Mysteries of the Moon and Space (1875), The Sun (1876), Lunar and Solar Suns (1884), The Sun (1885), Other Suns than Ours (1887), Old and New Astronomy (nearly completed in MS. at his death, and published 1888-90).
Procurator-fiscal, a legal officer in Scotland at whose instance criminal proceedings are taken in the local and inferior courts. He is appointed by the sheriff with the approval of one of the principal members of the law, and is not removed from office except for inability or misbehaviour, on a report by the Lord President and the Lord Justice-clerk. His business is to take the initiative in the prosecution of crimes. There being no coroner's inquest in Scotland, he does the work which that functionary performs in England, where the inquiry into the cause of deaths occurring under circumstances of suspicion. Whenever he has reason to believe a crime has been committed his duty is to apply for a warrant to arrest the alleged criminal, to summon and precognosce witnesses, and to living the case to the grand jury for trial. If he finds there is no evidence, or from which he thinks was either not committed, or of which there is no evidence satisfactory, he gives his concurrence merely to the private party who suggests it, but does not himself initiate the proceeding. When the procurator-fiscal takes the precautions of the writs, he sends for the proper legal counsel, of whom the Lord Advocate is the chief; and if these counsel think the evidence is strong enough, and warrants more than suspicion, the prosecution is proceeded with to trial.

Procyon. See RACCOON.

Prodigy. See OXMEN.

Producer Gas. See GAS-LIGHTING, p. 104.

Product. See EDUCT.

Professional. See AMATEUR.

Professor, an officer in a university, college, or other seminary, whose duty it is to instruct students, or read lectures on particular branches of learning. In the early times of universities the deans presided over the seminaries to act as public teachers; and the terms Master, Doctor, and Professor were nearly identical in signification. As, however, the body of graduates ceased in the course of time to have any concern in public teaching, a separate class of recognized teachers sprang up, paid sometimes with salaries, in other instances by fees from private sources. These were called professors; and in the German and Scottish universities they became the governing body, and sole recognised functionaries for the purpose of education. In the universities in which collegiate foundations prevailed, as Oxford and Cambridge, they were the heads of the various seminaries or auxiliaries, attendance on their lectures not being generally deemed indispensable, and the necessary business of instruction being carried on by the functionaries of the several colleges. See UNIVERSITIES, and the articles on the several universities.

The word professor is occasionally used in a loose way to denote generally the teacher of any science or branch of learning, without any reference to a university. It has been assumed as a designation not only by instructors in music and dancing, but by conjurors, athletes, and the like.

Profit-sharing was defined in a resolution of the Paris International Congress on Profit-sharing in 1889 as 'a voluntary agreement under which the employed receive a share, fixed beforehand, in the profits of a business.' It is argued and held to be proved by those in favour of the system, that profit-sharing advances the prosperity of an establishment. This is done by improving its quality, by promoting greater care of implements and economy of material, and lessens the risk of strikes, labour disputes, and the antagonism generally between capital and labour. Upwards of fifty British firms with 11,000 employees had by 1890 adopted some method of profit-sharing. Over eighty-one industrial establishments in France, Alsace, and Switzerland are working on a somewhat similar principle. Upwards of twenty-nine firms in the United States have also tried the experiment. In some of the native banks at Shanghai, every employee was paid a certain per cent of the annual division of profits. Profit-sharing has been tried by firms of painters and decorators; paper, cotton, and woollen factories, &c.; and the famous Bon Marché in Paris. The additional fund thus coming to the workman may be paid to him directly in cash, or may be put to a beneficial use, or from a view of securing him a share in the capital of the firm, or it may be a deferred benefit for sickness and old age. The management of the business, as a rule, still remains in the hands of the capitalists.

Turgot in 1775 recognised a principle of profit-sharing, but Edme-Jean Leclaire (q.v.), a successful Parisian painter and decorator, was the first to carry it to a practical use. He began by paying extra wages to his workmen, bonuses were then given to a few, a provident society was established which was succeeded by a distribution of profits. Leclaire by wonderful energy and caution had risen to the front rank in his trade, and became a large employer of labour. For the benefit of his workmen he had established a mutual aid society in 1838, which he found to be 'a powerful means of moralisation and a living example.' Having therefore decided for his sick, as a master who had himself been a workman he remembered their hopeless condition when too old for work. He read everything he could lay his hands upon which tended to help him to improve the social condition of his workmen. M. Fréger in 1842, when making inquiries as to the condition of his workmen, suggested the participation of the workmen in the profits of the master as an expedient for doing away with the antagonism between capital and labour. There is evidence that M. Fréger did not afterwards believe in his plan himself at first rejected it, and it was much later, he says, 'through engulding my brains, that in 1842 the thing appeared to me possible and one of the simplest to put into practice.' He had endeavoured gradually to educate his workmen up to the same point 1842-47. He established a provident society and the sum received was in proportion to annual earnings. In 1869 a deed was drawn up which stipulated that the net profits of the business should be divided into a certain fixed proportion between the managing partners, mutual aid society, and the regular workmen. Between 1849 and 1872 the mutual aid society and his workmen had received £44,000; down to 1882 the sum had reached £133,045. In 1870 the number which participated was 758, the dividend to workmen being 24½ per cent. on annual wages; in 1882 the sum of £6530 was divided amongst 968 persons, 1884 the number was 824, the sum distributed being £2920, or about 24 per cent. on wages; in 1889 the amount was £1290. Five per cent. on the capital of 400,000 francs is, like the wages, deducted from the gross profits in order to find the net profits. Of the net profits 50 per cent. goes to the provident society, 25 per cent. to the mutual aid society, and a 25 per cent. to the provident society, which has now become half owner of the capital of the firm. The effect of all this on the workmen has been to make them sober, thrifty, and industrious. Other painters and decorators in Paris followed suit. When asked a philanthropist, the founder said: 'I am simply a business man. I would rather gain 100,000 francs
and give away 50,000 than gain 25,000 and keep the whole for myself.'

The Co-operative Paper Works, Angouleme, founded by M. Laroche-Joubert, adopted a system of Dolgeville. The dividend is payable in cash; provision is made for the admission of workmen shareholders, and by 1890 one-fourth of the shares were in their hands. The workmen have no part in the management. In the years 1879-88 the sum distributed over and above wages was £29,000.

In Messrs Godin's iron-foundry, Guise, employing about 1,000 hands, the workmen's share of profits accumulates towards the purchase of shares in the firm. The first method adopted was that of the bonus; then the system of benefit societies; and for many years payments in cash. In 1880 the sum paid in interest on workmen's capital was £29,000, and in wages £75,000; the number of workmen participating was 550; in 1889 the number was 961. M. Godin said that 'ever since the system was established the workmen are interested in improving the kinds of profit-sharing, which offset sources of loss and defect, and they exert themselves to make new suggestions.' Mr Lowry Whittle, in his report to the Board of Trade, says that out of a squad, ignorant peasantry M. Godin has moulded to a moral and commercial discipline of a regiment and the commercial alertness of the market-place. Since 1881 M. Flint, of the iron-foundries at Paris and Soissons, has distributed a portion of net profits. In M. de Courcy's plan 5 per cent. of the profits are set aside every year to form an endowment for every employee, after twelve months' service, has a claim in the proportion of his year's salary to the total amount of profits set aside.

But those who have tested any system of profit-sharing declare that it requires much time and pains to produce substantial results, and a difficulty in working the system is that profit-sharers are not infrequently unwilling to share the losses of the concern. In France there was founded in 1878 a society for facilitating the practical study of the different kinds of profit-sharing, which issues a quarterly Bulletin de la Participation aux Bénéfices. Both on the Continent and in America there have been experiments made in co-operative farming, fishing, market-gardening, and co-operative workshops. Alfred Dolge, of Dolgeville, a Saxon by birth, and the largest manufacturer of felt shoes and piano felt, &c., in the United States, has in operation a system of what he calls earning (not profit) sharing amongst his employees, which originated in the conviction that in the creation of wealth certain of the employees contribute a greater share than is represented by their wages, and are entitled to something more than the wages proper. These real earnings can be determined by book-keeping, irrespective of any market-rate of wages. He claims that it is the selfish interest of every employer, as a means of actual ultimate gain, to find out what the earnings of each of his workmen are. The main features of the Dolge scheme are: a pension scheme, insurance endowment, and various benevolences. (1) Under the pension scheme 21 per cent. of the earnings of 50, after ten years' service, in case of partial or total inability to work; is entitled to a pension at the rate of 50 per cent. of wages earned during the year preceding; rising to 100 per cent. after twenty-five years' service. The pension fund is paid from yearly contributions set aside by the firm on behalf of each workman, and in 1891 it was reported that it would soon be self-supporting. (2) Fifteen years of service entitles to three insurance policies of $1000 each : 75 policies of a

value of $138,000 were existing in 1891. Over $20,000 had been paid in premiums by the firm.

(3) The endowment money is the sum credited each year on account of more work done than has been paid for in wages and is payable after five years' service, and is payable at the age of 60 or at death. Mr Dolge, for the benefit of his workpeople, has given a park of 400 acres, assisted in building houses, maintains a club-house and free library, and pays $600 a year to the school society.

Progress and Labour disputes are reported as unknown at his factories.

In Great Britain any system of profit-sharing is not of such long standing as in France. The system adopted at the Whitwood Collieries of Messrs Briggs, Yorkshire, lasted beneficially from 1884 to 1876, when it ceased on account of the participation of the workmen in a strike against reduction of wages. During that time £34,000 had been distributed in percentage on wages. This percentage was paid when the net profits exceeded 10 per cent. on the capital embanked, one-half going to the workmen (Seal hemp) on proportion to earnings. Profit was also made for the work-people securing shares when the concern became a limited liability company.

The method of profit-sharing employed by many British firms has been derived from the French, which is generally adopted. 'From and after the 1st of September 18— the surplus (if any) of the clear profits of the business, beyond such definite sum as is for the time being reserved to the firm for their own benefit, shall be divided into two equal parts; one thereof to be distributed (not of legal right, but gratuitously) as a bonus to the employees in the manner defined by these rules, and the other to be retained by the firm.'

See Leroy-Beaulieu, Répartition des Richesses (1881); Hart's Maison Lecteur (1883); Taylor's Profit-sharing (1884); Wright's Profit-sharing (Boston, 1886); Doherty's Participation aux Bénéfices (1888); Gilman's Profit-sharing (1889), which contains a full bibliography; Bushill's Profit-sharing Scheme, with list of British profit-sharing firms; Die gerechte Verteilung des Geschäfliesrenten (1891); Lawson's Profit-sharing Precedents (1891); articles by Schliss in Contemporary Review for 1890; The Just Distribution of Earnings, an account of Dolge's scheme (1891); the report to the Board of Trade by Mr Lowry Whittle (1891); Bushill's Profit-sharing and the Labour Question (1892); and the articles Co-operation, Socialism.

Prog nosti c a u s. See Almanac, and Meteorology, Vol. VII. p. 155.


Progreso, the port of Merida, in Yucatan, from which it is 25 miles N. by two lines of railway. It stands on an open bay, exposed to every wind, and is one of the worst harbours in the world; but it has a very large export trade in beniique (Brown sugar).

Progression, in Arithmetic, is the succession, according to some fixed law, of one number after another. A series of numbers so succeeding one another is said to be 'in progression.' Progression may be of various kinds, but the three forms of most frequent occurrence are: (1) Geometrical Progression (q.v.), (2) Harmonical Progression (q.v.). If the terms of an arithmetical progression be inverted they form a series in harmonic progression; thus, 1, 2, 3, 4, 5, 6, &c. is an arithmetical progression; and 1, 4, 9, 16, 25, 36, &c. is a harmonic progression. This series is principally important in connection with the theory of music, in determining the length of the strings of instruments. See Harmonics.

Progression, Musical. The regular succession of chords or the movement of the parts of a
musical composition in harmony, where the key continues unchanged, is called Progression; where a new key is introduced it is not progression, but Modulation (q.v.).

**Prohibition.** See Liquor Laws, and Temperance.

**Projectile** is the name given to any mass thrown so as to describe a path in air near the earth's surface. The path described is called the trajectory. The importance of the subject springs from its close connection with Gunnery (q.v.). Any mass projected into the air is under the action of two forces: first, its weight, acting downwards when projected; second, the resistance of the air to motion through it, which resistance is a function of the speed, and depends also on the form, size, and mass of the projectile.

If we consider the action of gravity alone, the problem is a very simple one. Since the force of gravity is always vertical, there can be no change in the value of the horizontal component of the velocity. The projectile, projected from any point O (see fig. 1) at any inclination, will come to rest at the highest point A. At this point the vertical velocity will be zero; and, if the horizontal velocity were here suddenly reversed, the projectile would travel back along the same trajectory to O. As it is, the projectile proceeds along the path AO′, which must be exactly similar to AO. In short, the trajectory is symmetrical about the vertical line drawn through the highest point A. Reckoning from A, let us suppose the projectile to reach P after t seconds. Then, if the horizontal velocity is u, the distance of P from the vertical line AP = u′t. Let the projectile be thrown through the height AM at a velocity v; then v′ = u′/g is the horizontal speed, and the distance of P from the vertical line AP = v′t. The space fallen through, being measured by the product of the average speed and the time, is

\[ AM = \frac{2uv}{g} = \frac{2gMP}{v^2} = \frac{2gMP}{v^2} \]

The trajectory is therefore a Parabola (q.v.), with its axis vertical.

If we suppose the projectile to be projected with a velocity whose vertical and horizontal components are respectively u and v, then the angle of projection has its trigonometrical tangent equal to u/v. The time taken to reach the highest point is u/v; and the total range on the horizontal plane is

\[ O′O = 2OB = \frac{2uv}{g} \]

If we interchange u and v so that the tangent of the angle of projection becomes v/u, instead of u/v, we get still the same range. Generally, then, a given point, O′, can be reached by two trajectories with the same initial speed of projection. It is easy to show that the two corresponding directions of projection are equally inclined to the line that makes 45° with the horizontal; and the range is greater according as the components u and v of the given initial velocity are less unequal in magnitude. The greatest range is obtained when the angle of projection = v/g. Being the total velocity of projection, i.e., when the angle of projection is 45°, in this case the range is v^2/g. Thus, to throw a ball to a distance of 100 yards or 300 feet it is necessary to project it with a velocity of at least 100 feet per second (nearly). Practically, however, because of the atmospheric resistance, it would need a distinctly greater speed of projection than that just given to attain the desired range.

A very simple observation suffices to show that the parabolic trajectory is only approximately realised in air. A well-driven cricket or golf ball will be seen to be oscillating slightly as it proceeds, but second, the resistance of the air to motion through it, which resistance is a function of the speed, and depends also on the form, size, and mass of the projectile.

If we consider the action of gravity alone, the problem is a very simple one. Since the force of gravity is always vertical, there can be no change in the value of the horizontal component of the velocity. The projectile, projected from any point O (see fig. 1) at any inclination, will come to rest at the highest point A. At this point the vertical velocity will be zero; and, if the horizontal velocity were here suddenly reversed, the projectile would travel back along the same trajectory to O. As it is, the projectile proceeds along the path AO′, which must be exactly similar to AO. In short, the trajectory is symmetrical about the vertical line drawn through the highest point A. Reckoning from A, let us suppose the projectile to reach P after t seconds. Then, if the horizontal velocity is u, the distance of P from the vertical line AP = u′t. Let the projectile be thrown through the height AM at a velocity v; then v′ = u′/g is the horizontal speed, and the distance of P from the vertical line AP = v′t. The space fallen through, being measured by the product of the average speed and the time, is

\[ AM = \frac{2uv}{g} = \frac{2gMP}{v^2} = \frac{2gMP}{v^2} \]

The trajectory is therefore a Parabola (q.v.), with its axis vertical.

If we suppose the projectile to be projected with a velocity whose vertical and horizontal components are respectively u and v, then the angle of projection has its trigonometrical tangent equal to u/v. The time taken to reach the highest point is u/v; and the total range on the horizontal plane is

\[ O′O = 2OB = \frac{2uv}{g} \]

If we interchange u and v so that the tangent of the angle of projection becomes v/u, instead of u/v, we get still the same range. Generally, then, a given point, O′, can be reached by two trajectories with the same initial speed of projection. It is easy to show that the two corresponding directions of projection are equally inclined to the line that makes 45° with the horizontal; and the range is greater according as the components u and v of the given initial velocity are less unequal in magnitude. The greatest range is obtained when the angle of projection = v/g. Being the total velocity of projection, i.e., when the angle of projection is 45°, in this case the range is v^2/g. Thus, to throw a ball to a distance of 100 yards or 300 feet it is necessary to project it with a velocity of at least 100 feet per second (nearly). Practically, however, because of the atmospheric resistance, it would need a distinctly greater speed of projection than that just given to attain the desired range.

A very simple observation suffices to show that the parabolic trajectory is only approximately realised in air. A well-driven cricket or golf ball will be seen to be oscillating slightly as it proceeds, but second, the resistance of the air to motion through it, which resistance is a function of the speed, and depends also on the form, size, and mass of the projectile.
attain a velocity of 522 feet per second. If projected downward with a greater velocity it will be restrained, since the resistance due to the atmosphere is greater than the weight of the body. If projected upwards with a speed of 800 feet per second it will reach a height of only 5112 feet instead of nearly 10,000, and will return to earth again with a velocity of 500 feet per second. These results show that a meteoric stone never reaches the earth's surface with a velocity of more than a few hundred feet per second. It matters not with what relative speed the meteor may meet the earth. Once it gets into the atmosphere its kinetic energy is rapidly dissipated. The velocity being a product of the resistance volatilised at the high temperature that results. Our atmosphere, in fact, acts as a practically perfect shield to meteoric bombardment.

For projectiles discharged from firearms, see the articles on Bullet, Cannon, Cartridge, Firearms, Gun, Rifles, Shell, Shot.

Projection is the representation on any surface of objects or figures as they appear to the eye of an observer. It thus includes Perspective (q.v.), and is most simply illustrated by the shadow of an object thrown by a candle on a wall; the shadow being the projection and the place of the light the projection point. The theory of perspective is of great importance, both in mathematics and geography, being, in the former case, perfectly general in its application, while in the latter only the projection of the sphere is required. Projections of the sphere are of various kinds, depending upon the distance from the point of projection of the sphere, and the form of the surface on which the projection is thrown; thus we have the orthographic, stereographic, globular, conical, and cylindrical or Mercator's projections, all of which are treated of under the article MAP. Another projection frequently employed is the gnomonic. In the gnomonic projection the eye is supposed to be situated at the centre of the sphere, and the surface on which the projection is thrown is a plane surface which touches the sphere at any one point (called the principal point). It is evident that a map constructed on the gnomonic projection is sensibly correct only for a circular area whose circumference is at a small angular distance from the principal point. From the position of the eye in the gnomonic projection (which is not suited for representations of portions of the earth's surface) it follows that all great circles or portions of great circles of the sphere are represented by straight lines, for their planes pass through the eye. The gnomonic projection derives its name from its connection with the mode of describing a gnomon or Dial (q.v.). The gnomonic and stereographic projection of crystals is described and illustrated at Crystallography.

Prolapsus Ani is a common affection of the termination of the intestinal canal, and consists in an erosion of the lower portion of the rectum, and its protrusion through the anus. It may depend on a naturally relaxed condition of the parts, as in infancy, or may be caused by violent straining in cases of constiveness, piles, &c. Whenever it occurs the parts should be washed, and if possible replaced by careful pressure with the hand; and if they do not easily return the forefinger should be oiled and pushed up the rectum, and the patient should be very strict in his diet, with which the patient should retain the recumbent position for some hours. If it cannot be returned by the above means surgical assistance should be at once sought. In order to remove the tendency to prolapse, the patient will require frequent kinetic exercise to avoid constiveness, should sponge the parts after every evacuation with cold water or soap and water, and if necessary use astringent injections, as, for example, a weak solution of sulphate of iron, 1 grain to the ounce. In young children the power of straining, and therefore the tendency to the occurrence of the protrusion, may be much diminished by preventing their feet from resting on the ground during defaecation. Dr Druitt (in his Survey of the Course of Mephisto)—viz., that when the stools are passed the skin near the anus should be drawn to one side with the hand so as to tighten the orifice. If after the adoption of these means the bowel continues to descend certain surgical means must be resorted to, such as removal of the relaxed mucous membrane by the application of nitrate of silver or nitric acid, or removing a part of the loose skin surrounding the orifice, with or without portions of the mucous membrane as well.

Prolapsus Uteri. See Womb.

Proletaricide. a term used to denote the lowest and poorest classes of the community. It is derived, through the French, from the Latin proletariat, the name given in the census of Servius Tullius to the lowest of the centuries, who were so called to indicate that they were valuable to the state only as carriers of burdens (proles); hence the word has come much into use in the literature of Socialism (q.v.); see also Marx.

Prologue, a preface or introduction to a discourse or poem, as the prologue to Chaucer's Canterbury Tales; but more especially the discourse or poem spoken before a dramatic performance, corresponding to the Epilogue (q.v.) at its close. This usually stands outside the action of the piece, an external adjunct to it, being, indeed, a mere address to the public occasioned by the play. The introduction proper, again, belongs to the action itself, and this we find illustrated for us in the prologue of Euripides, spoken by one of the characters, in narrative form, half within and half without the action; in the separate induction of many old English plays; and in the preludes and prologues of modern dramas like Faust.

Prometheus, a great culture-hero of Greek mythology, the son of the Titan of Cóyney, brother of Atlas, Memnon, and Epimetheus. Hesiod tells his history as follows: Once, under the reign of Zeus, when men and gods were disputing with one another at Mecone as to which portions of the victims at sacrifices were to be given to the gods, Prometheus, seeing an ox, and placed on one side the best parts covered with offal, on the other the bones covered with fat. Zeus was asked to choose, but, finding the deceit practised upon him, avenged himself on the mortals by withholding from them the fire necessary for the cooking of the meat; whereas Prometheus stole it in a hollow fennel-stalk, and brought it to them. Zeus next caused Hephaestus to mould a virgin of wondrous beauty, Pandora (q.v.), whom Epimetheus was unwise enough to receive as a present from Hermes, and thus brought through her all imaginable ills upon humanity. Prometheus himself was chained to a rock, and an eagle sent to tear his liver by day, while Zeus caused it to grow anew during the night. At length Hercules killed the eagle, and by the permission of the goddess Minerva succeeded in rescuing Prometheus. Thus far Hesiod's legend. In the splendid tragedy of Aeschylus, the Prometheus Victus, Prometheus is an immortal god, a friend of the human race, who does not shrink from opposing the evil designs of Zeus against mankind, and even dares to meddle with the working of fate. He is the long-suffering hero, who, although overcome by Zeus's superior might, yet does not
bend his mind. He takes from man the evil gift of foreseeing the future, but gives him the two infinitely superior gifts of hope and of fire; and he is the inventor of architecture, astronomy, writing, figures, medicine, navigation, the mystery of prophecy, the arts of metal-working, and all other arts which embellish and adorn life. For these boons conferred on the human race he is by Zeus's own charter ranked to a rock in Scythia by Hephaestus, who fulfils this task reluctantly. Here he is visited by the Oceanides, by Io, and by Hermes, who endeavours to find out which of Prometheuses alone knows, who will be the readier son of Zeus and his consorts. Divine intelligence claims that he is struck by Zeus's lightning and hurled into Tartarus, whence he only re-issues after a time to undergo new sufferings. He is now fastened to Mount Caucasus, and the eagle, an offspring of Earth and Tartarus, comes to torment him daily. Chelion, the Centaur at last offers himself to supply the place of Prometheus in Hades—for on no other condition was he to be liberated than that some other immortal should offer himself in his stead. Chelion, incurably wounded by Heracles, is accepted by Zeus as a perpetual substitute for Prometheus.

The Greeks, divulg'd the myth, Epimetheus ('after-thought') is his opposite; and the beautifully ingenious identification of the solar mythologists with the Sanskrit Pramantha, the fire-stick of the Hindus, may be disregarded in the face of the existence of the myth far beyond the possible range of Aryan influence.

See the article Fire, p. 630; E. B. Tyler's Researches into the Early History of Mankind (1865), and Kuhn, Die Herkunft des Feuers (24 ed. 1886); older books on the myth by Welcke (1842) and Lasaulx (1843), and monographs by Helle (Berl. 1857) and Milchhöfer (Berl. 1882).

Promise. See CONTRACT, MARRIAGE.

Promissory-note, a written promise by one person (the payee) to another (the payor) or bearer of a sum of money either on demand or on a future day. It is in the following form:

£100.
London, 1st January 189—.

Three months after date I promise to pay Mr. William Smith or order One Hundred Pounds for value received.

John Brown.

With certain necessary exceptions, such as the rules regarding acceptance, the law of a Bill of Exchange prevails.

Promotion in the commissioned ranks of the British army, since the abolition of the purchase system in 1870, is obtained by seniority and by selection. On a midshipman passing all his examinations for the rank of lieutenant, he receives his commission as sub-lieutenant, and is then advanced to lieutenant, except in a few special cases, by seniority. Those specially selected for promotion have either obtained a first-class in all subjects of examination, or else have distinguished themselves on active service or other special service. Advancement from the lieutenants' to the commanders' list may be said to be by pure selection. As there are supposed to be 1000 lieutenants on the active list and only 250 commanders, it is inevitable that this should be the case. Except, however, for very distinguished service, lieutenants are not promoted before having served ten years in that rank, and the promotions are generally to be found among officers who have ten to fifteen years' seniority as lieutenants with a proportionate amount of service. Promotion from the lieutenants' to the commanders' list is also by selection; but there is this difference, that as the number of commanders is only some 70 in excess of the captains, any commander who puts in the requisite amount of sea-service can count, with a fair amount of probability, on being promoted. Captains and admirals are promoted on their respective lists by pure seniority; the three admirals of the fleet are selected for good service from admirals who have command of a squadron either as rear- or vice-admiral.

Promptorium Parvulorum, an English Latin dictionary, compiled c. 1440 by Geoffrey Chaucer, a friar-preacher at Lymn in Norfolk.

Prong-horn. See ANTELOPES.

Proof. See EVIDENCE; also ENGRAVING.
Proofs, Correction of. The corrections to be made on a 'proof' of printed matter are marked on the margin; and for this purpose an established set of signs or shorthand is used. The following specimen of a proof exhibits the application of most of these signs:

To rule the nations with imperial sway, to spare the humbled, and to crush the proud, resigning ito others to describe the courses of the heavens, and explain the rising stars; this, to use the words of the poet of the Aeneid in the apostrophe of Anchises to Fabius in the Shades, was regarded as the proper province of a Roman. The genius of the people was even more adverse to the cultivation of the physical sciences than that of the European Greeks, and [seen] we have that the latter left experimental philosophy chiefly in the hands of the Asian and African colonists. The elegant literature and metaphysical speculations of Athens, her histories, dramas, epics, and orations, had a numerous host of admirers in Italy, but a feeling of indifference was displayed to the practical science of Alexandria. [This repugnance of the Roman mind at home to mathematics and physics, extending from the Atlantic to the Indian Ocean, from Northern Britain to the cataracts of the Nile, annihilated in a measure all pure sciences in the conquered districts where they had been pursued, and prohibited attention to them in the mother country.]

Long, indeed, after the age of Ptolemy, the school in connection with which he flourished, remained in existence; &c.

(1) A wrong letter. After every mark of correction a line should be drawn, to prevent its being confounded with any other in the same line. (2) A word or letter to be transposed. Where letters only are to be transposed, it is better to strike them out, and write them in their proper sequence in the margin, like a correction. (3) A space wanted. This mark is also used when the spacing is inconstant. (4) A space or quadrat sticking up. (5) Alteration of type. One line is drawn under the word for initials, two for small capitals, three for capitals. (6) Correction or insertion of stops. (7) A word struck out, and afterwards approved of (Lat. dec., 'thus marked'). (8) A typographical error. (9) An omission. (10) A letter of a wrong fount. (11) A word or letter to be deleted. (12) Alteration of type. (13) A new paragraph. (14) Insertion of a clausule. (15) A space to be removed or diminished. (16) A wrong word. (17) When letters or lines do not stand even. (18) Mark for a hyphen. (19) No new paragraph. (20) The manner in which the apostrophe, inverted commas, the star and other references, and superior or 'cock-up' letters and figures are marked.

The immediate object of a 'reader' or corrector of the press is to observe and mark every error and oversight of the compositor, with a view to make the proof as perfect a copy of the author's manuscript. This is on the supposition that the manuscript itself is quite correct, which is seldom the case; and therefore the duty of a good reader extends to seeing that there are no inconsistencies in orthography, punctuation, abbreviations, &c., and in many cases to the correction of quotations, dates, and proper names. Where extensive alterations, omissions, or additions are likely to be made by writer or editor, it is more convenient to take the proofs on long slips, before division into pages. The striking of new paragraphs, or the suppression of those in type, should be avoided as causing trouble and expense.

The duty of securing consistency in spelling and punctuation is especially important in the case of works on which several writers are employed, such as newspapers and the weekly, taking in at the same time also to direct his attention to the numbering of the pages; to the arrangement of chapters, paragraphs, and notes; to running titles, &c. It is part of his business to observe the mechanical defects of the work—defective types, turned letters, inequalities of space between words, sentences, and lines, crooked lines, and to secure symmetry in verses, tables, mathematical operations, and such like. In almost all cases two proofs are taken, and in different works, such as those in foreign languages, titles, &c., even more. Lastly follows the proof reader, in whose hands it is his duty to see that the compositor has made all the corrections marked on the last proof. It is usual for the writer or author to reserve the correction of the second proof for himself.

The thankless and monotonous business of a corrector or reader is more difficult than the uninitiated would believe. It requires extensive and varied knowledge, accurate acquaintance with the art of typography, and, above all, a peculiar sharpness of eye, which, without losing the sense and comprehending the whole, can read at the same time each separate word and letter. See BOOK, PRINTING.

Propaganda (Lat. De Propaganda Fide), the name of a Congregation (q.v.), and also of a College, in Rome, the object of which is to direct and forward the propagation of the Catholic religion, especially amongst the heathen, and to conduct the dissenters from the Roman Church are also included in the sphere of its operations. The institution was originated by Pope Gregory XIII. (1572-84); but it was fully organised by Gregory XV., who in 1622 established a special Congregation for the purpose. This his successor, Urban VIII., extended and endowed, annexed a college for the education of missionaries to the several countries. One great feature of that college has been to provide for each new nationate of the several countries, although Church and state, at Rome, an establishment for the purpose of being specially educated in all the necessary learning of a missionary. This Congregation conducts the affairs not only of the missionary countries properly so called, but also of those in which the hierarchical organisation is not fully established. The College of the Propaganda is a noble institution, with some 200 pupils of all countries, tongues, and complexions, who are not only maintained and educated gratuitously from a very early age, but are equipped and sent forward to their several destinies at the charge of the institution. It possesses a valuable library (30,000 vols.) and museum, and a polyglot printing-press. Its great festival is the Epiphany of our Lord—His 'manifestation to the Gentiles;' and this feast is celebrated by an exhibition of exceeding interest.
and curiosity, at which are delivered recitations in every language represented in the College, and its missions, amounting often to fifty or sixty. Of this festival Cardinal Mezzofanti (q.v.) used to be the guiding spirit.

**Properius, Sextus** (for the second family-name, Aurelius, often given him there is no authority), the most impasioned of the Roman elegiac poets, was a younger contemporary of Tibullus, born about 48 B.C. in Umbria, probably at Assisiun (the modern Assisi). Nearly all we know of him is gleaned from his writings, according to which he became of an undistinguished, comparatively poor family, lost his father in boyhood, and had a position as a tutor to Timotheus, later Philipus, by the Triumvirs, to reward their veterans, but retained means enough to proceed to Rome for education, and, having chosen his residence, like Virgil and Maccenas, on the Esquiline, to make poetry the business of his life. The school then fashionable was the Alexandrian, represented by Callimachus and Philetas, and these he made his models, drawing from them his learned tone and his wealth of mythological colouring. In the political and martial movements of the time he took no part, though his patriotism was pure and strong. Exultation over the victory of Actium, his scorn of Cleopatra and her presumptuous ambition to dominate the mistress of the world, above all, his appeal to the Romans to renounce self-indulgence and to return to their neglected legends for the civic virtues and the heroism of 'the brave days of old,' Such was his precept; while his practice was the emotional poetic life, in the congenial society of Ovid, Virgil (whose *Hercules* he has nobly eulogised), the epic poet Pontius, and Julius Bassus. Like them he won the favour of Maccenas, to whom he dedicated a book of his poems, and even impressed himself with Augustus, whose achievements he duly celebrated. But the central figure of his inspiration was his mistress Cynthia, a lady somewhat older than he, whose real name was Hostin. For many years he cherished a glowing passion for this highly gifted, but far from virtuous him, till about 24 B.C. he disentangled himself from her. She died before him; but even after death she lived in his memory as she still lives in the poems that have immortalised her. Properius left Rome, it would appear, only once, on a visit to Athens. It is believed by some that he was shipwrecked, which is a vividly described. The year of his death has, with probability, been placed about 14 B.C. Of his poems only the first book, devoted entirely to Cynthia, was published during his lifetime; certainly the last of the four was given to the light, in terms of his will, by his friends. Its contents are youthful pieces, in which he celebrates the legends of early Rome in the style of Callimachus, and have a special interest in having most likely inspired Ovid to the composition of his *Fasti*—perhaps even of his *Heroides.* As a poet Properius is inferior to his Alexandrian contemporaries—the tone of the latter criticism with Goethe at its head—being one of increasing admiration for his native force, his eye for dramatic situation, his power over the reader's sympathies, giving the effect of reality to what in the hands of Tibullus or even Ovid degenerates into the mere expression of his own moods. His love is common with Catullus than with either of these, while he lacks the artistic graces peculiar to the three, being often rough to harshness and obscure from defect of finish.

For the English student there is an admirable translation by Palgrave (Bohn's Classical Library) and translations by Palgrave and Postgate in their respective editions. There is no adequate translation of him in any language, Cranston's, in English (1875), being about the most faithful.

**Property.** See Heritable and Movable, Land Laws, Personality, Possession, Real. **Prophecy.** For the doctrine of prophecy and its relation to prediction, see Bible, Vol. II. p. 110. See also the works of prophets cited at the articles Isaiah, Jeremiah, &c.; the works on prophecy by Hofmann, Delitzsch, Tholuck, Ewald, Kuenen, Reuss; Fairburn, *Prophecy* (1856; 2d ed. 1864); Stanley, *Greek and Roman Prophecy* (1888); W. R. Smith, *The Prophets of Israel* (1852); Riehn, *Messianic Prophecy* (Eng. trans. 1891). **Propolls.** See Bk, Vol. II. p. 21. **Proportion, in Arithmetic and Geometry, is a particular species of relation subsisting between groups of numbers or quantities. Notwithstanding that the idea of proportion is found to exist in perfection in the mind of every one, yet a good definition of it is a matter of extreme difficulty. The two definitions which, on the whole, are found to be least objectionable are that of Euclid and the ordinary arithmetical definition. The latter states proportion to be the 'equality of ratios,' and throws us back on a definition of the term ratio, which, most authors, would be considered the relation of two numbers to each other, shown by a division of the one by the other. Thus, the ratio of 12 to 3, expressed by 12 or 4, denotes that 12 contains 4 times; and the ratio of 8 to 2 being also 4, we have from our definition a statement that the four numbers, 12, 3, 8, and 2, are in proportion, or, as it is commonly expressed, 12 bears to 3 the same ratio that 8 does to 2, or 12:3::8:2. In the same way it is shown that 3:8::15:36; for 4 expresses the ratio of the first to the second, and 3/12 = 3/36 = 1/12. It will be gathered from the two arithmetical proportions here given, and from any others that can be formed, that the product of the first and last terms (the extremes) is equal to the product of the second and third terms (the means); and upon this property of proportional numbers directly depends the arithmetical rule called 'proportion.' &c. The object of this rule is to find a fourth proportional to three given numbers—i.e. a number to which the third bears the same ratio that the first does to the second; and the number is at once found by multiplying together the second and third terms, and dividing this product by the given first. It is illustrated arithmetically by such problems as, 'If four yards cost six shillings, what will ten cost?' Here, 15 being the fourth proportional to 4, 6, and 10, fifteen shillings is the answer. The distinction of proportion into direct and inverse is not only quite unnecessary, but highly misleading, as it tends to create the idea that it is possible for more than one kind of proportion to subsist. continued proportion indicates a property of every three consecutive or equidistant terms in a 'Geometrical Progression' (q.v.) for instance in the series 2, 4, 8, 16, 32, the first, 2, 4, 8, 16, 32, &c. and 2:8::8:32, &c. In the above remarks all consideration of incommensurable quantities has been omitted. The definition given by Euclid is as follows: Four magnitudes are proportional when, and only when, the multiples taken of the first and third, and any whatever of the second and fourth, according as the multiple of the first is greater, equal to, or less than that of the second, the multiple of the third is also greater, equal to, or less than that of the fourth; i.e. A, B, C, D are proportional, if, if mA is greater than nD; if mA is equal to nB, mC is equal to nD; if mA is less than nB, mC is less than nD; if mA is equal to nB, mC is equal to nD; if mA is less than nB, mC is less than nD; m and n being any multiples whatsoever. The apparent cumbrousness and circum-
PROTEUS

PROTECTIVE LEGISLATION

Simon N. Patten (1890); Our Sheep and the Tariff, by the present writer (1891); Geo. B. Curtiss, Protection and Prosperity (1896).

With the above article, by an American protectionist, Mr WM. Draper Lewis, should be compared the article Free Trade, in Vol. IV., by Professor Shield Nicholson, written from the opposite point of view.

Protective Legislation, a term applicable to legislation in promotion of Protection as opposed to Free Trade, is more specially used of legislation in favour of certain communities, or of particular businesses, to cut specially to stand in need of it, the Factory Acts (q.v.) being a notable example. To the same category belong the Employer’s Liability Act (see LIABILITY), the Merchant Shipping Acts, much of the legislation in regard to mines, Crofters (q.v.), and Irish tenants (see LAND LAWS). The supporters of the Laissez-faire (q.v.) theory of government, even when admitting justification for some of those measures, protest against others of them or parts of them as interfering with industry and commerce, and tending to limit freedom and establish a socialistic state despotism. The general idea to limit the working day to eight hours is resisted on the same ground; and some extend their protest to free education, free libraries, and government measures for the housing of the poor. See A Plea for Liberty, by Thomas Mackay, with preface by Herbert Spener (1891).

Protector, a title which has sometimes been conferred in England on the regent or governor of the kingdom during the sovereign’s minority. It was given to Humphrey, Duke of Gloucester, in 1422, in the minority of Henry VI. Richard, Duke of Gloucester, was Protector in 1483, prior to his ascension to the throne. Richard III. The Duke of Somerset, one of King Henry VIII.’s eighteen executors, was in 1547 constituted Protector during the minority of Edward VI., with the assistance of a council, consisting of the remaining seventeen executors; a dignity, however, which he enjoyed for but two months. Oliver Cromwell, in December 1653, took the title of Lord Protector of the Commonwealth of England, Scotland, and Ireland. In 1658 his son Richard succeeded to his title and authority, but was never formally installed in the Protectorate, which he resigned in the following year.

Protocols are an essential class of substances, mostly of animal origin, but occurring also in the vegetable kingdom, of which egg albumen may be taken as a good example. The various members of the class are closely related to each other, and amongst them they make up the greater portion of the animal organism. The classification of the proteins is given in the article Animal Chemistry (q.v.). The most careful analyses of the various proteins show that they all closely approximate to the same ultimate composition, and contain about 33.5 per cent. of carbon, 7 of hydrogen, 15.5 of nitrogen, and from 3 to 10 of sulphur. The majority of the proteins exist in two modifications, the one soluble and the other insoluble in water. The latter modification can be obtained from the former by the addition of alcohol or ether, or of many mineral acids or metallic salts. Some of the proteins are obtained, when heated with a solution of mercuric nitrate containing a little nitrous acid, they assume a violet-red colour; and when the solution of a protein substance in acetic acid is mixed with strong sulphuric acid, a violet-

coloured solution is obtained, which in the spectrum shows characteristic absorption bands.

By the action of the gastric juice, of pepsin and dilute hydrochloric acid, and of several other ferments, the proteids are eventually converted into peptones. The latter are soluble in water, and are not coagulated by heating. See ALBUMEN, CASEIN, FIBRIN, and GLOBULINS.

Proteles. See AARD-WOLF.

Proterosaurus (Gr. proteros, ‘first,’ sauros, ‘reptile’), a genus of fossil reptiles occurring in the Permian system, which is the lowest horizon at which reptilian remains have as yet been detected. It is of a primitive type, and belongs to a highly generalised group of reptiles. The skull is imperfectly known, but the teeth appear to have been ankylosed to the bone, and not implanted in distinct sockets, as was at one time supposed.

Protestantenverein, an association of Protestant ministers, professors, and others belonging to the ‘liberal’ or advanced school of theology in Germany, formed in 1863 to promote what its members insisted was the spirit of the Protestant freedoms, and in opposition to what they regarded as reactionary and obscurantist. By the orthodox and conservatives the association was denounced as rationalist or infidel; and though since 1867 it has held annual meetings at towns throughout Germany, and has several organs in the press of the Fatherland (including the Protestantische Kirchenzeitung and a Jahrbuch), it and its members have been treated with marked disfavor by the ecclesiastical authorities, membership in the association being, it is alleged, practically a bar to appointments or preferments. See Schenkel, Der Deutsche Protestantenverein (new ed. 1871).

Protestantism, a term derived from the part taken by the adherents of Luther in protesting against the decrees passed by the Catholic states at the second diet of Spires or Speier in 1529. This decree had forbidden any further innovations in religion, and enjoined those states that had adopted the Reformation so far to retrace their steps as to reintroduce the Mass and order their ministers to avoid disputed questions, and to use and explain the Scriptures only as they had hitherto been used and explained in the Church. This was done by a considerable section of the Anglican Church. See CHURCH HISTORY, LUTHER, REFORMATION.

Proteus, in the Homerian or oldest Greek mythology, appears as a prophetic ‘old man of the sea’ (háthos géron), who tends the sail-flocks of Poseidon (Neptune), and has the gift of endless transformation. His favourite residence, according to Homer, is the island of Pharis, off the mouth of the Nile; but according to Virgil, the island of Carpathos (now Skárpmato), between Crete and Rhodes. Here he rises at mid-day from the floods, and sleeps in the shadow of the rocky shores, surrounded by the Cari, or men and monsters of the sea. It is the time when those who wished to make him prophesy must catch him. But it was no easy task. Proteus, unlike most vaticinal personages, was very unwilling to prophesy, and tried to escape by adopting all manner of shapes and disguises. When he found his endeavours hopeless he assumed his proper form, and then spoke out unerringly about the future.

Proteus, a genus of tail amphibia with persistent gills, represented by two or three species in the caves of Carinola and Dalmatia. They are tank animals, living in the dark for length; and with their peculiar habitat may be considered the pale colour of the flesh, and the embryonic state of the eyes, which are hidden beneath the surface. It has been shown, however, that sensitiveness to
PROTEVANGELIUM

Athenians, they natural vegetable is in the '5o workmanship. glutinous, sometimes associated PROTOPLASM

Protococcus (Gr., 'first-grain'), a genus of very simple unicellular green plants, one species of which (P. urceolus) is everywhere abundant as a green film on tree-trunks and damp walls, or in stagnant rain-water. The colour is sometimes reddish, and the organism may be found passively encysted during drought, and at other times actively motile with a couple of cilia. See ALOE.

Protococcus (Gr., 'first-grain'), a genus of very simple unicellular green plants, one species of which (P. urceolus) is everywhere abundant as a green film on tree-trunks and damp walls, or in stagnant rain-water. The colour is sometimes reddish, and the organism may be found passively encysted during drought, and at other times actively motile with a couple of cilia. See ALOE.

Protocol (Gr. protos, 'first,' and cola, 'glue'), [1] the rough draft of an instrument or transaction, and more particularly the original copy of a government despatch, treaty, or other document; [2] a record or register.

Protoplasma (Gr., 'first-born'), a granite rock, composed of the same ingredients as true granite, but the mica is more or less altered so as to resemble talc, while the feldspar is not formed. It received its name because it was supposed to have been the first-formed granite. It abounds in the Alps, and is found also in Cornwall. The clay produced by its decomposition is greatly valued for the manufacture of china. Protoplasma is now recognised to be simply altered granite.

Protoplasma (Gr., 'first-born'), a granite rock, composed of the same ingredients as true granite, but the mica is more or less altered so as to resemble talc, while the feldspar is not formed. It received its name because it was supposed to have been the first-formed granite. It abounds in the Alps, and is found also in Cornwall. The clay produced by its decomposition is greatly valued for the manufacture of china. Protoplasma is now recognised to be simply altered granite.

Protogen (Gr., 'first-born'), a granite rock, composed of the same ingredients as true granite, but the mica is more or less altered so as to resemble talc, while the feldspar is not formed. It received its name because it was supposed to have been the first-formed granite. It abounds in the Alps, and is found also in Cornwall. The clay produced by its decomposition is greatly valued for the manufacture of china. Protoplasma is now recognised to be simply altered granite.

Protogenes (Gr., 'noble'), a mineral of ancient Greece, was born at Cannus in Caria, and practised his art at Rhodes, where he worked steadily on through the din of the siege of 305–304 B.C. A contemporary and friend of Apelles (q.v.), he was a slow and careful painter, sparing no pains to secure a natural and finished piece of work. His best-known pictures were Ilyssus (a Rhodian celebrity), a Satyr, 'Paralos and Ammonias' (sacred ships of the Athenians, executed for the Propylaea at Athens), 'The Thesmophoros' (for the Athenian senate-house), 'Alexander and Pan,' 'Cypdoc and Typhoeus,' and some portraits.

Protomosis. See Menopoma.

Proto-notify, a member of the College of Proto-notaries Apostolic in the papal curia, whose duties are to register pontifical acts, make and keep the records of benefactions, &c.

Protophyta (Gr. Protophyta, 'first plants'), a term often applied to the simplest plants, such as Protococcus in the algae, and Bacteria in the fungoid series. See ALGAE, BACTERIA.

Protos ('first,') plasm, ('formed substance') is a technical name for living matter.

The term was first applied (1846) by the botanist Hugo von Mohl to the 'slimy, granular, semi-fluid' contents of vegetable cells, but before that Rösel von Rosenhof (1755) had studied the amasra, which is a mass of relatively pure living matter. Robert Brown and other botanists had watched the rotation of the living substance inside the cells of some plants, and Dujardin (1833) had described the 'sarcode' of Foraminifera as 'a glutinous, transparent, living jelly. After Dujardin and Von Mohl had thus directed attention to 'sarcode' and 'protoplasm,' observations on both gradually accumulated, the idea began to be mooted that the two substances were essentially the same, and in 1861 Max Schultze defined the cell as a nucleated mass of living matter or protoplasm. We cannot indeed say that the protoplasm is the same in the cells of plants and animals, for the precise nature of living matter defies our analysis; but we do know that the physical basis of life' has in all cases some common characteristics of structure and behaviour, diverse as are the ways in which its ineradicable elements may be manifested.

Protoplasm may be conveniently studied in the unicellular Protozoa—e.g. Amoebae and Foraminifera; in the colourless cells of blood; in the ova of animals—e.g. of frog and pond-snail; in young vegetable shoots; or in the cells of a simple plant, like Chara or Spirogyra. When we submit the living matter in its natural state to microscopic examination we usually see a clear semi-fluid substance, sometimes obscured by granules, sometimes with numerous bubbles or vacuoles, sometimes with hints of a fine network traversing the whole. This vacuolated and reticular structure is much more easily demonstrated after the cells have been 'fixed' and stained, and, if necessary, 'sectioned' according to the practice of microscopic technique. In this state the network-like appearance of the cell-substance has been demonstrated in a great number of cases, and we may fairly regard it as characteristic (see CELL).

As the students of structure have been led with increasing carelessness of microscopic analysis to distinguish between the netted framework and a more fluid stuff in its meshes, so many physiologists have attempted to distinguish between the two parts, which lives and is relatively stable, from the content which is acted on, and is in a state of physical and chemical change. It is clearly necessary to discriminate between protoplasm in the strict sense and the substances with which the living organism is constitutionally furnished and about to be or being utilised, and waste-products which result from the vital activity. The food-granules and the waste-products we can analyse—they may be respectively glycogen and uric acid; the living matter we cannot analyse, for it dies at the moment our analysis begins.

All physiologists are agreed that waste-products are formed when work is done or while life lasts, and that living organisms have a characteristic power of repair. They are ever changing, and yet they remain more or less the same. Streams of matter and energy pass into the organism; they are somehow incorporated into the living capital, work is done and waste is given off, and the organism continues from day to day, or from year to year, relatively intact. For while the transfer of energy into any animate material system of an equation the transfer and conductive dissipation, the secret of protoplasm, as expressed by Joly in the language of physics, is that the transfer of energy into any animate material system is attended by effects conductive to the transit and retardant of dissipation. So far we have stated facts; speculation begins when we try to express the precise relations of the
PROTOPLASM

PROUDHON

PROUDHON regarded unit difference of is. The We deter-characteristic to called it researches and, thought. a regard 451 is the without drawing itself. variously approval researches. Two it continually which the the gain secure numerous lieganls. On the result of knowledge, and the many sciences leaded the. prompting. Huxley of life, and the conceptions of the whole. of our knowledge, and the new in the biological and physical sciences. The organism lives to constant disruptive or analytic changes, which result in the liberation of energy and in the formation of simpler and simpler waste-products. Thus protoplasm is regarded as the characteristic of metabolism. Metabolism is continually being unmade, breaking up, and wasting as it lives; it is continually being made by the constructive processes of repair. We call the repairing or constructive process anabolism, and its chemically discernible steps katabolism, and its chemically discernible steps katabolates.

But, on the other hand, we may regard protoplasm as a kind of ferment which influences the material round about it without itself being so directly instrumental in the productive or imitative process. It is the relatively stable cause of metabolism, acting on less stable material of a less complex nature, acting upon it so that constructive anabolic processes or disruptive katabolic processes predominate for the time.

Furthermore, while all are agreed that in the life of organisms there is a characteristic alternation or antithesis between waste and repair, between discharge and restitution of energy, between katabolism and anabolism, there is difference of opinion as to the character of these antagonistic processes.

The physical philosophers, Gaskell, prompted by his researches on the functions of nerves, some of which command activity while others induce rest, was led to regard what he called anabolism and katabolism as processes which bear to protoplasm a relation similar to that which sleep and wide-awake life bear to the organism. The 'winding-up' process of anabolism or restitution goes on (autonomically) of itself; the 'running-down' process of katabolism or discharge is determined by stimulus. Anabolism is comparable to the self-development of a child, whose internal stimulation is compared to a gun. But the German physiologist, Hering, prompted by his researches on colour-sensations, was led to regard what he called assimilation and dis-assimilation as two antagonistic kinds of activity, both dependent on stimuli which determine the prevailing chemical process.

Apart from the precise biological problems which are raised when we seek to define the limits of our analytic knowledge of living matter, there is the great difficulty of forming any conception of the relation between life and its physical basis. We may cite Huxley's famous address on The Physical Basis of Life and Hitchens' Stirling's essay As Regards Protoplasm as pre-eminent types of the numerous endeavours which have been made to secure accurate thinking about this supreme problem of biology. Everyone may be inclined to gain some knowledge of protoplasm or living matter. On the one hand, we know it as it is presented to our senses in living organisms, and the result of our analysis of this presentation leads us to recognise in protoplasm a marvellously subtle kind of material motion, of which modern science has little idea. On the other hand, we have an intimate knowledge of protoplasm in our own brains, where its activity is manifested in thought. That we need not attempt to give an explanation of ultimate realities like protoplasm and thought, that thought is only a function of material motion, whatever its ultimate nature, is a form of thought, that thought and protoplasm are different aspects of one reality, are the respective conclusions of the cognitivist, the materialist, the idealist, and the monist philosophers who have theorised about living matter.

See BIOLOGY, CELL, PHYSIOLOGY. The technical literature on protoplasm is not readily accessible, but references to researches since 1886 will be found in the annual Zoological Record. Yet the older investigations are cited by Prof. Geddes in the article 'Protoplasm,' Ency. Brit. The student will find the best introduction to modern speculations, such as those of Gaskell and Hering, in Prof. Huxley's article 'Physiology,' Ency. Brit. in Prof. Dardon Sanderson's presidential address to the Biological Section of the British Association (Report Brit. Assoc. 1889), and Nature, 21 (1889).

Protopustis. See MUD-FISHES.

Prototheria. See ECHIDNA, MAMMALS.

Protozoa (Gr. prton, 'first,' and zoan, 'animal'), simple unicellular animals, contrasted with the multicellular Metazoa. Except in a few cases, each Protozoon is a single cell, a unit-mass of living matter physiologically complete in itself. Being such a unit involves being without organs and without a reproductive system. Yet the animal may have parts, and two individuals may unite in mutual fertilisation. A Protozoon is to any higher animal, from sponge onwards, as an egg-cell is to the body into which it develops. But the exceptioncasual instances which we refer to as important—they are loose colonies or aggregates of Protopra. Formed by the incomplete separation of dividing units, they bridge the gulf between single-celled and many-celled animals. Simplicity of Protozoa are such forms as Protozoa, whose life is a procession of changing phases, ameboid, ciliated, flagellate. The others may be classified according to the predominance of one or other of these phases. The Rhizopoda, predominantly ameboid, include Amoeba and others like it, Foraminifera, Heliozoa, and Radiolaria. The Gregarines are predominantly sluggish and ciliated. The Infusorians are usually active, ciliated, or flagellate. These Protozoa are discussed separately.

Prototretachna. See PERIPATUS.

Protractor, a mathematical instrument, used in drawing or plotting, for the laying down of angles. It is variously shaped, and may be circular, semicircular, or rectangular.

Proud-flesh is the popular term for coarse and too luxuriant granulations springing up on Wounds (q.v.) or Ulcers (q.v.). See also INFLAMMATION.

Proudhon, Pierre Joseph, a noted French socialist, was born July 15, 1809, at Besançon, in which town his father was a poor cooper. Through the good offices of charitable friends, he received the rudiments of his education at the college of his native place, and from the first gave great promise of talent. While still very young, however, he quitted the institution in order to aid his family, who had fallen into great distress, and sought employment in a printing establishment. Here he was noted for the most punctual discharge of duty; and of changed phases, ameboid, ciliated, flagellate. The others may be classified according to the predominance of one or other of these phases. The Rhizopoda, predominantly ameboid, include Amoeba and others like it, Foraminifera, Heliozoa, and Radiolaria. The Gregarines are predominantly sluggish and ciliated. The Infusorians are usually active, ciliated, or flagellate. These Protozoa are discussed separately.

Prototretachna. See PERIPATUS.

Protractor, a mathematical instrument, used in drawing or plotting, for the laying down of angles. It is variously shaped, and may be circular, semicircular, or rectangular.

Proud-flesh is the popular term for coarse and too luxuriant granulations springing up on Wounds (q.v.) or Ulcers (q.v.). See also INFLAMMATION.

Proudhon, Pierre Joseph, a noted French socialist, was born July 15, 1809, at Besançon, in which town his father was a poor cooper. Through the good offices of charitable friends, he received the rudiments of his education at the college of his native place, and from the first gave great promise of talent. While still very young, however, he quitted the institution in order to aid his family, who had fallen into great distress, and sought employment in a printing establishment. Here he was noted for the most punctual discharge of duty; and of changed phases, ameboid, ciliated, flagellate. The others may be classified according to the predominance of one or other of these phases. The Rhizopoda, predominantly ameboid, include Amoeba and others like it, Foraminifera, Heliozoa, and Radiolaria. The Gregarines are predominantly sluggish and ciliated. The Infusorians are usually active, ciliated, or flagellate. These Protozoa are discussed separately.

Prototretachna. See PERIPATUS.

Protractor, a mathematical instrument, used in drawing or plotting, for the laying down of angles. It is variously shaped, and may be circular, semicircular, or rectangular.

Proud-flesh is the popular term for coarse and too luxuriant granulations springing up on Wounds (q.v.) or Ulcers (q.v.). See also INFLAMMATION.

Proudhon, Pierre Joseph, a noted French socialist, was born July 15, 1809, at Besançon, in which town his father was a poor cooper. Through the good offices of charitable friends, he received the rudiments of his education at the college of his native place, and from the first gave great promise of talent. While still very young, however, he quitted the institution in order to aid his family, who had fallen into great distress, and sought employment in a printing establishment. Here he was noted for the most punctual discharge of duty; and of changed phases, ameboid, ciliated, flagellate. The others may be classified according to the predominance of one or other of these phases. The Rhizopoda, predominantly ameboid, include Amoeba and others like it, Foraminifera, Heliozoa, and Radiolaria. The Gregarines are predominantly sluggish and ciliated. The Infusorians are usually active, ciliated, or flagellate. These Protozoa are discussed separately.

Prototretachna. See PERIPATUS.

Protractor, a mathematical instrument, used in drawing or plotting, for the laying down of angles. It is variously shaped, and may be circular, semicircular, or rectangular.

Proud-flesh is the popular term for coarse and too luxuriant granulations springing up on Wounds (q.v.) or Ulcers (q.v.). See also INFLAMMATION.

Proudhon, Pierre Joseph, a noted French socialist, was born July 15, 1809, at Besançon, in which town his father was a poor cooper. Through the good offices of charitable friends, he received the rudiments of his education at the college of his native place, and from the first gave great promise of talent. While still very young, however, he quitted the institution in order to aid his family, who had fallen into great distress, and sought employment in a printing establishment. Here he was noted for the most punctual discharge of duty; and of changed phases, ameboid, ciliated, flagellate. The others may be classified according to the predominance of one or other of these phases. The Rhizopoda, predominantly ameboid, include Amoeba and others like it, Foraminifera, Heliozoa, and Radiolaria. The Gregarines are predominantly sluggish and cilated. The Infusorians are usually active, ciliated, or flagellate. These Protozoa are discussed separately.
he paid a visit to Paris; and subsequently contributed to the Encyclopédie Catholique of M. Parent Desbarres the articles 'Apostesie,' 'Apocalypse,' and others. In 1840 he issued the work entitled Qu'est-ce que la Chine? ("What is China?") which afterwards became so famous. The nature of the doctrine announced in it is sufficiently indicated in its bold paradox, soon to be widely popularised—La Propriété c'est le Vole ("Property is Theft"). Notwithstanding his attack on property, which gave great offence to his enemies, Proudhon held his pension for the regular time. In 1842 he was tried for his revolutionary opinions, but was acquitted. In 1846 he published his greatest work, the Système des Contradictions Économiques. During the revolution of 1848 Proudhon abstained to return to France. He was elected member of Assembly for the Seine department, but he could not there gain a hearing for his extreme and paradoxical opinions. He found more adequate scope for his energy in the press, publishing several newspapers, in which the most advanced theories were exploded in the most virulent language. He attempted also to establish a bank which should pave the way for a socialist transformation, by granting gratuitous credit, but failed utterly. The violence of his utterances at last resulted in a sentence of three years' imprisonment, and in March 1850, he was tried and convicted, but released the following June, and surrendered to the prison of Sainte Pelagie. While shut up there he married a young working woman. During his imprisonment he gave to the world the works entitled Confession d'un Révolutionnaire (1848), Actes de la Révolution (1849), Gratitude du Crédit (1850), and La Révolution Sociale démontrée par le Coup d'État (1852); the last of which is remarkable, in the light of subsequent events, for the clearness with which it states the alternative of l'anarchie ou l'Ordainisme, as pressed on Louis Napoleon, then president. In June 1852 he was set at liberty, but in 1858 was again condemned to three years' imprisonment, and retired to Belgium, where he continued to publish from time to time on his favourite subjects of speculation. Amnestied in 1860, he died in obscurity at Leuven on January 6, 1869.

The theories of Proudhon cannot be presented in a clear or systematic form; we can only give some account of the most important of them. He held that property was theft, insomuch as it appropriates the value produced by the labour of others in the form of rent, interest, or profit without rendering an equivalent. He maintained that one service can be duly repaid only by rendering another, whereas the owner of land and capital abuses his position by exacting all manner of service without giving an equivalent. His famous paradox respecting analogj, which he regarded as the culmination of social progress, was simply an exaggerated and premature assertion of the great principle that the fully-developed man should be a law to himself—that is, the moral progress of man should make government and external law unnecessary. In the perfect society order would be secured and maintained in the absence of government through the reasonable self-control of the free individual. Laws, police, the whole machinery of government as now established are the marks of an imperfectly developed society. Personally Proudhon appears as an elderly man of medium stature in a monograph of Sainte-Beuve, which unfortunately was not finished. His complete works fill 33 vols. (Paris, 1889–76); his correspondence, 14 vols. (1874).

See Sainte-Beuve, Proudhon, sa Vie et Correspondance (1852); A. Debjacard, Pierre Joseph Proudhon (1886); the articles Anarchie, Socialism, and works there cited.

Prout, Samuel, painter in water-colours, was born at Plymouth, 17th September 1783. He studied from nature, and sketched with Haydon through Devon and Cornwall, his drawings in the latter county being called 'Water-colour Country.' In 1797 he visited England and Wales. In 1805 he removed to London, in 1815 was elected to the Water-colour Society, and in 1818 went to Rome by Havre. The picturesque street-architecture and fine Gothic remains there made so strong an impression on his mind that afterwards the principal works were those in which architecture had a prominent place; and from time to time, in his after-career, he made excursions, ramsecking every corner of France, Germany, the Netherlands, and Italy for picturesque architectural remains. Prout's name is amongst the few who have been invited or instructed by his numerous elementary drawing-books, in the slightest of which talent and feeling for art are congeous. His water-colour drawings are characterised by decision in handling, great breadth, and pleasing colouring. He died February 9, 1852.

See Ruskin's Memoir of Prout in Art Journal (1852); and his Notes on the Loan Collection of Drawings by Prout and Wm. Hunt (1879–90).

Provençal Language and Literature. The Provençal language, belonging to the sixteenth branch of the principal branches of Latin speech, usually classified by philologists under the title Romance languages. The name Provençal, which appears to be derived from the Provincia Romana of Caesar, was not used in the earlier middle ages except in the restricted sense of the language or dialect of Provence proper. The troubadours themselves used the term langue romana (or lo romans). The term langue d’oc was also known in the middle ages, but was afterwards transferred to designate a province of France. The Provençal and other Neo-Latin idioms existed as dialects of the Latin previous to the Germanic invasions, having replaced the ancient languages of Gaul. Although the Provençal and the northern French had originally sprung from the same stock, they had gradually grown distinct from one another. Yet the two at the time that they differed almost as widely as French and Italian. The Provençal language at the time of the troubadours extended far beyond the boundaries of Provence proper. It extended over the area from the Alps to the Pyrenees and the Mediterranean to the Loire. Beyond France it was known in the east of Spain—in Catalonia and Aragon, and in the Balearic Isles—also in Savoy, Piedmont, and part of Switzerland.

The pure Provençal idiom, in which the poets of the 12th century sang, was used by the higher classes over the whole of the district referred to, but the bulk of the people knew only their own dialects—viz. the Provençal (proper), Pielmontese, Gascon, and Catalan, all of which differed but slightly from one another. At the end of the 15th century, consequent upon the establishment of the French domination in the south and the introduction of the northern French language, the literary Provençal began rapidly to disappear, while the vulgar dialects still remained; and it was in them that the compositions of the later middle ages were written. The Provençal language was more highly influenced by Spanish than any other. It was the earliest of these to be fixed grammatically. It was highly adapted for lyre poetry, owing to its melodiousness and its rhyming facilities. The grammarian Vidal referring to it says: 'La parla
dura francesea val nulis es ciplus avivens a far
n'altres nel lingua venelena mai per fer vers et cancons et sirventes' (The
French speech is better and more suited for making epics and pastoral poetry, whilst that of Lemosin [i.e. the Provençal] is better for making love-songs and satire. This is to be noted chiefly a greater simplicity of inflections and grammatical forms and a large admixture of French words.

The first employment of the Provençal language in writing dates back to about the 9th century, and, in the 10th century, certain Provençal songs were thought worthy of being written down. There are many such songs which have survived, mostly in Latin, but mixed more or less with Provençal words and phrases. It is to the priests and monks that are most probably due the earliest attempts at composition in the Provençal language. They were the first to arouse the imitations of the people they composed or translated from the Latin into the vulgar idiom pious tales, allegories, legends of saints, &c. There were also introduced into the liturgy, along with the prayers and hymns in pure Latin, others in the popular dialect. In Béziers, Aigues Mortes, and Tours preaching in the popular language was recommended to the clergy. Towards the close of the 11th century a revival took place in Provençal poetry consequent upon the religious wars of the Crusades and the introduction of the knightly chivalric ideal. The chansons de geste of Spain undoubtedly, too, had its effect in the development of Provençal poetry and culture. The poetry of medieval Provence has much in common with that of the Moors.

Although it was in the north of France that epics flourished in the middle ages especially flourished, still in the south it was by no means so neglected as many have supposed. Among the earliest compositions in the Provençal language were undoubtedly epic romances, treating either of historical subjects, such as the struggles against the Franks or the wars with the Moors of Spain, or else of the semi-mythical deeds of Charlemagne and King Arthur which formed the basis of the Carlovingian and Arthurian (or Round-Table) legends. Of these old popular epics which were sung and handed down from generation to generation we possess but few traces. From the middle of the 12th century epic poetry may be divided into popular and artistic. Of the first class but few specimens remain, but of the artistic epic they are more numerous, probably owing to the more artistic tastes of the 13th century. Here it was more necessary to commit them to writing.

The Provençals did not cultivate the drama like the French; in fact the only productions that might come under this head are pieces on pious subjects in dramatised form, such as the Mystery of the Passion, the Marriage of the Virgin, &c. Provençal literature was essentially poetic, and its prose works are of little importance. They were in the early period mostly translations from the Latin, sermons and chronicles—also the biographies of the principal troubadours. Later, in the 13th and 14th centuries, the prose works became more numerous, and included scientific, juridical, philological, and other works. The lyric poetry is by far the best-known branch of Provençal literature. It was in lyric verse that the Provençal poets attached themselves to the sentiments of chivalry and love—of that devotion and devotion to women which had become with them a sort of worship.

The word troubadour (in Provençal trobar, troubador) is derived from the verb trobar (Fr. trouver, to find, invent, compose) from Lat. +findere, 'to move,' meaning latterly 'to seek,' and also 'to find'). This verb was used only with reference to the composition of lyric poetry. Hence, strictly speaking, a troubadour means a poet of the lyric form. Epic poets were styled moélaires (Fr. nouellistes, 'romancers'). The troubadours were of two classes—viz. professional and amateur. Amongst the latter were many nobles and even kings, as, for instance, Richard Cour de Lorraine, Robert de Fiennes, Charles of Poitou, Provence, and Toulouse; of the professional troubadours also many were of high birth. Generally speaking, the latter were recruited from all ranks of society (merchants, soldiers, monks, lawyers, &c.), and they were of various nationalities. The nobles, who had led a wandering life, frequently travelling beyond the limits of their own country—more especially into Spain, visiting Catalonia and Aragon, and even Castile, Beyond the Alps they visited Piedmont, Lombardy, and Tuscany, where many of them settled. Others—mostly those who were tired of wandering—attached themselves to the households of the great feudal lords, wherein they played an important part. There were no fixed schools of poetry for learning the troubadour's art. Some of the troubadours, especially the amateur, attached themselves as pupils to some celebrated troubadour, or by visiting the great châteaux which the more distinguished poets were accustomed to frequent. The convent, too, was a great school of song; the monks had both the means and leisure to cultivate this form of poetry. Towards the 13th century there were many monks amongst the troubadours. At a later period professors of poetry established themselves in the chief towns of Provence: Peire Cardinal settled as such at Tarascon in the 13th century. The first of the troubadours of whom we know was Guiraut, the Count of Foïers, a powerful noble of the south of France. He flourished towards the end of the 11th century. To the first half of the 12th century belong Cercamon (or Cherchemonde), Marselôn, who was originally attached to the court of Cercamon in his wanderings; Peire d'Alvernha, a troubadour of great merit; and Bernart de Ventadurn, who was famed for the grace and sweetness of his poetry. The second half of the 12th and first half of the 13th centuries was the most brilliant period of Provençal poetry. Of the many poets who flourished during this period the following are the most distinguished: Gaucelm Faidit; Gui d'Uisel; Peïrols; Arnaud de Marsuel, the author of many exquisite love-songs; the talented Folquet, Bishop of Marseilles; Peire Vidal of Toulouse; Count Guiraut; the versatile poet; Arnaud Daniel, the chief of the artificial school; Girart de Bornel, considered by the Provençals themselves to be the finest of all their poets (though Dante and Petrarch both regard Arnaud Daniel as superior to him); Ramblant de Vaquerias; Guillelm de Castellanl, a most melodious singer; the Monk of Montaudon, a powerful and unspiring satirist; Raïmon de Miraval; Uc de Saint Cire; Guillelm Adhemar; Bertrand de Born, the author of many warlike stances; Guillelm Figueirn; and Peire Cardinal, the great writer of juridical and allegorical satire. The latter half of the 13th century shows the poetry of the troubadours in its decline, and few of the poets of this period deserve to be classed with those of the previous one. Towards the close of the century lived Arnaud Riber, a poet who has been termed the 'last of the troubadours.' He specially cultivated the popular forms of lyric poetry, particularly the pastoret. Among the long list of troubadours (about 400 in all) there are only about a dozen women-singers of whom we know. Their works, so far as one can judge from the scanty fragments that remain, are much inferior in merit to those of the troubadours. The most distinguished among them was the Countess Beatrix de Dia, who has been termed the Sappho of Provence.
The compositions of the trouvères were intended to be sung to the accompaniment of some musical instrument. In most cases the poets themselves composed the melodies for their pieces. The text was called mots, the melody son. There is no doubt that many of these works were sung, accompanied by simple instruments, and played for them. These professional musicians they found among the jongleurs (Fr. jongleurs) or wandering minstrels. The origin of the jongleur as a professional dates back to the time of the Romans; they were the descendents of the joculatores, who took part in the ancient circus-games. The jongleurs of the middle ages were a sort of travelling showmen, who gave performances at village feasts, and were often accompanied by trained dogs and monkeys. There were some of them, however, whose profession was rather more artistic than mere buffoonery or jugglery; they became the singers and accompanists of the troubadours. Some were in the service of the troubadours, and travelled about with them; others went about individually, singing either bought or had presented to them by the troubadours. The latter, as a class, held themselves much above the jongleurs, though it sometimes happened that jongleurs rose to the ranks of the troubadours.

It was only from the 12th century that a poetic system began to be fixed, and the different branches of lyric verse received distinctive titles. Previous to that period every lyric poem was termed vers, from the Latin versus, 'a hymn,' because the early lyric compositions were modelled on the ecclesiastical verses, whatever their subject might be. Epic compositions were termed prose. The two principal branches of lyric poetry were the canso or love-song and the sirventes or satire. The canso was the outward expression of love and its various phases. In order to write the lovesong (to traher) it was essential, according to the ideas of Provençals, that the poet should be in love himself, that he should be inspired by the passion before he could give expression to it. Their idea of love, it may be remarked, was not wholly that of romantic adoration; hence the many licentious allusions in the lyric literature of all time. 

The canso generally closed with a few lines in which the poet apostrophised himself or his song, and commissioned it to explain his sentiments to his lady-love. This was termed the formula. The term sirventes or sirvente was used to comprise not only satirical poems, but generally every class of lyric composition that did not treat of love. These were divided into various classes—personal, social, political, moral, and religious—the last named including the songs of the Crusades. In their social satire the troubadours attacked with energy the vices and follies of all classes, and the lamento of the clergy were frequent, more especially at the time of the Albigenses war, when the poets sided with (one or two exceptions) with the heretics against the Church of Rome. In doing so they do not appear to have many unqualified attacks on the question of doctrine as by hostility to the northern French intruders, and we do not find any of them putting forward heretical opinions in their works, with the single exception of one piece by Péire Cardinal.

The crusades against the Saracens formed a considerable portion of the troubadours' lives, and they celebrate in song their longings and glory. Most of the crusade-songs we possess relate to the third crusade, which took place during the most flourishing period of Provençal poetry. In these songs they exhorted their countrymen to rise and take up arms against the infidels. War in general—not merely religious—was a favourite subject with the troubadours. The most famous writer of warlike sirventes was Bertrand de Born (q.v.), a typical medieval baron.

The teunso was a sort of dispute or contention in verse. In the form of a dialogue between two troubadours, generally versifiers, relating to love or chivalry, Teunso actually did take place among the troubadours, although in many of their poems the antagonists would appear to be merely fictitious persons. This form of verse was of eastern origin, and was common among the Arabs, and even the Persians.

Besides the canso, sirventes, and teunso, there existed also simpler, more popular forms of lyric verse. Originally the balada was a poem intended to be sung in dancing. It consisted generally of three strophes, and was remarkable for its graceful dance-like rhythm. The pastorela (pastoreta), or shepherd's song, was always a favourite form of verse with the Provençal poets. The alba (or dawn-song) and the serena (or even-song) were also cultivated by the Provençals. The latter is to be distinguished from the alba, which is a dance-song, with a refrain of six stanzas, each of six lines, in which the rhyming words of the first stanza were carried on through all the others in an inverted order. The opposite of the serena was the descort, which was subject to no definite rules as regards metre, rhyme, or length of stanzas. Some poets even purposely sought after discordance. A distinguished troubadour, Rainbaut de Vicoireus (1180-1207), in one of his pieces uses five different languages (viz. Provençal, Tuscan, French, Gascon, and Catalan) in five succeeding verses, though the six lines of the Provençal rhyme of all five. The sonnet is frequently supposed to have been of Provençal origin. But the only two examples we know of in that language were by an Italian who composed in Provençal, Dante da Majano. The probability is that it was peculiar to the Italians, though doubtless it was the outcome of the influence of the Provençal versification. Sonnet in Provençal is simply identical with son, meaning melody.

The two distinguishing characteristics of Provençal versification are the rhyme and the syllabic accent. Some have supposed that their ideas of metre were influenced by the Moors, but it is more than likely it was natural to the Provençals. The great number of final syllables of the same sound existing in the declensions and conjunctions of their language made it easy for them to produce a variety of rhyming, and they had no scruple to do with the form of their poetry. Owing to their excessive regard for form, there is noticeable in the lyrics of the troubadours a certain sameness or want of variety of sentiment, and a tendency to be artificial rather than natural. Yet the high merit of their poetry must be acknowledged. We consider how much were the times in which they lived, and how few literary models they had to guide them. The culture of the Greeks and Romans had long been extinct, and of classical literature they knew nothing, whilst at the time of the highest point of their development the poetry of northern France, of
PROVENÇAL

England, of Germany, and of Italy was yet in its infancy.

Rapid as had been the rise of Provençal poetry, as rapid was its decline. What more than anything else was the cause of this decline was the war against the Albigenses (q.v.) in the 13th century, which proved disastrous to

the nobles of the south of France. Their lands were laid waste, their castles destroyed. Besides this, the desire of the region to distinguish itself in the south the French language began to be generally used among the upper classes; thus there was no longer any encouragement for the troubadours. Their poetry ceased to be cultivated as formerly. The clergy, too, in their fanatic endeavours to extinguis

herself, destroyed large numbers of Provençal works, and in a bull Pope Innocent IV. styles the Provençal a heretical language, and forbid the use of it to the clergy.

With the 13th century the real literary life of the Provençals had disappeared. The two following centuries, to mention only the period in which the traditions of the troubadours still lingered on. In the first half of the 14th century an effort was made to revive the old poetry. Seven citizens of Toulouse, under the title La sobremesa compcnheca dels seus troubadors (1330), aimed at reviving the old troubadour style of

song. Under the auspices of this society were organised Jeux Floranz, or poetic contests, at which prizes were given. The activity of the society was not confined to Toulouse; branch societies were formed there about the south of France, and even in Catalonia and Aragon; but, though it existed for several centuries, this society could never effect what it aimed at—viz. the restoration of the brilliant period of Provençal song. In the 14th and 15th centuries prose works became more numerous. Some more learned treatises—legal, moral, legal, and philological—local chronicles, and pious tales or legends.

During the following three centuries there are almost no Provençal works worthy of notice. In the 19th century, however, a new poetic activity began to manifest itself, rekindling with the poet Jacques Janssen, or Jasmin (q.v.), and after him Romanille, the founder of the Society of the Félières (which has in view the preservation of the Provençal language and customs). Mistral (q.v.), a poet of great genius, Aujourd, and others, have revived the Jeux Floranz, have also been introduced to aid the movement.

On the subject of the Provençal Language see Diez, Grammatica Romanicae Sprachen (1836-38; 5th ed. 1882); Raynouard, Lexique Roman (1889-94), and his Grammaire compacite des Langues de l'Europe Latine (1821); Mahn, Grammatik et Wörterbuch der Altprowin-

zischen Sprache (1886 et seq.); D. B. Ritchie, An Introduction to the Study of Provençal (1887). On the literature see Diez, Die Poesie der Troubadours (2d ed. 1888), and Altroumanische Sprachendeken (1846); Raynouard, Choix de Poésies originales des Troubadours (1816-21); Fauriel, Histoire de la Littérature Provençale (1871); Check et Troubadours de la France Poétique du Moyen Age (1864); and Alaric Barlow, Grammatica Sprachentwurze der Provençal-

ischen Sprach (1872), and Chronologie Provençale (4th ed. 1888); Huesler, The Troubador, a History of Provençal Life and Literature (Lond. 1878); Mahn, Die Bibliographien der Troubadours (2 d ed. 1879); Gaden-Arnoux, Monuments de la Littérature Provençale depuis le 12e Siècle; Milly et Fontana, Les Trouveres en Espagne (Barcelona, 1861); Paul Meyer, Les derniers Trouba-

dours de la Poesie Poétique de la Provençal (1877).

PROVENCE, formerly a maritime province of France, was bounded on the S. by the Mediterranea, and comprised the modern departments of the Roubes du Rhône, Var, Busses-Alpes, and parts of Alpes Maritimes and Vaucluse. It included a portion of the Roman province of Gaul generally
called simply Province (the Province), whence it derived its name. The Provençal (q.v.) tongue, however, was spoken over a much larger area (see also the section on the language and literature of FRANCE). Provence was overrun in the 5th century by the Visigoths and Burgundians, for a time was under the Saracens, and in 879 was mostly incorporated with Cisjurana Burgundy (q.v.) and with it was attached to Germany. The main part of the region was incorporated in the County of Arles, also known as Counts of Provence, and was practically independent. Early in the 12th century the countship passed by inheritance to Raymond Berengar, Count of Barcelona, and under the protection of his successors Provençal poetry attained its zenith. In 1245 the last count died, and the inheritance passed, through his daughter, to her husband Charles of Anjou, who united Provence with Naples. Under the Angevin princes the constitution of Provence, with its three estates holding the power of the purse, was well balanced and free; and it is possible that through St. Louis de Montfort (q.v.) the English parliamentary constit-

ution may be indebted to it. The last of the counts, Charles, grandson of René the Good (q.v.), bequeathed his county to the dauphin of France; and it was united to that county in 1480 by Charles VIII.

Several of Daudet's works give vivid pictures of Pro-

vencal scenery, life, and character; and there are histories of Provence by Papon (1777-86) and Mercy (1800), and descriptive works by Garin (1852) and Lenterin (1879). Descriptive sketches of some of the antiquities and archi-

tecture are given in Baring-Gould's In Troubadour Land (1891). See also ANJOU, FRANCE, AVIGNON.

PROVERBS. All attempts to define a proverb, from the time of Aristotle downwards, have been unsuccessful. One of the difficulties is to find an essential difference between that which is a proverb and that which it is not. For example, 'He who goes to sea, sails, or wades,' is a proverb in the sense that the same is said in several countries, and it is thus customary in some countries to write: 'He who goes to sea, sails, or wades.' In default of an exact definition we must content ourselves with the definitions of the following proverbs:—The wisdom of man, and the wit of one, or that of Cervantes—' Short sentences drawn from long experience,' or the poet—'The Roman poet, Cipriano de Valera—' Short sayings, sententions and true, and long since accepted as such by common consent.' This last has the merit of recognising what is in truth the distinctive charac-

teristic of the proverb, that it is a popular current saying adopted as a convenience by the community. All the qualities said to be essential to it, shortness, sense, salt, and the rest, are sub-

sidy to this. To be current it must be easily remembered, and therefore, within certain limits, short; within those limits it would be short without salt; it would not take the popular fancy. But there is another quality no less essential than these which seem to be always ignored, and that is general applicability. Unless a saying is capable of being applied to a variety of cases it can never become a proverb. Let Puffendorf, in his famous dictum, 'Dirt is only matter in the wrong place,' has sense, salt, and shortness, but it will never be a proverb. It is of no use except in sanitary discussion and when dirt is in question. Lord Derby's answer, after trying a South African port wine, that it was 'especially remarkable for its quality, the smell of the gout,' has a much better chance, for it serves every purpose of 'The remedy is worse than the disease,' and is far richer in salt. A proverb is in fact a colloquial coin, not for exclusive dealing at any one particular stall in the market, but
It is in fact a primitive form of "elusiveness." If an Arab or Persian orator waxes fervid on the theme of equality and bombards his hearers with pompous platitude about Nature's law, some greybeard will ask, "Rabbi God made the five fingers of thy hand all equal!" and solvendo risum tabulæ. In the nature of things, therefore, it is impossible that the proverbial speech shall bear upon current events and excellent speech. The Celtic races, it may be observed, never greatly favoured proverbs. But for all that proverbs are very far from being the dry bones they are sometimes supposed to be. If any one took the trouble to register carefully all the proverbs he overheard, the result would be, no doubt, a very considerable bulk of material. Any one who has noticed his notice in the course of a day, making a note of allusions in his newspaper, whether in leaders, parliamentary, law, or police reports, letters from correspondents, critiques, or pulling advertisement; jotting down these he overhears in the railway carriage or tramcar, those dropped in business conversation, in chat at the club, in table-talk at and after dinner; and in fact from breakfast to bedtime keeping his ears open for proverbs, he would find probably that they enter into our daily speech to a much greater extent than he had suspected. They are the language, so to speak, of our society. So completely have they ingrained themselves that we talk of gift horses, and half-loaves, and a bird in the hand, and sauce for the goose mechanically and without any thought of speaking proverbially. There is no family perhaps that has not proverbs or rudimentary proverbs of its own, founded on some adventure or drollery or blunder of one of its members, and used proverbially by all, often to the perplexity of the uninstructed visitor; and what is true of the family is true of the community on a more extensive scale. It is the language of our society, of its fable, similes, similitudes, incomprehensible to the outsider, but full of meaning to all who are to the manner born. Of these there will be now and then one more generally applicable and negotiable than the rest, with more of the true proverb metal and ring in it, which in time will pass the bounds of the community and become the property of the nation. A man sees another bolting out of his house, and asks what he has been about there. "You'll see when the eggs come to be fried," says the other, making off; which is explained when it is time to fry them, they having all the while been stolen. It will be first a family joke; then a parish joke; then a stock saying in the market-place—very good; time will tell; you'll see when the eggs come to be fried; then a saying in many market-places; and so at last a proverb. This is the actual story of one enshrined in Don Quixote—Al freire de los huevos.

As they pass from the family and the community to the nation, so they pass from one nation to another. The purely national proverbs form only a portion of the proverbs in any language. It almost seems as though there had been, in all the times memonal, a kind of proverb exchange through which any serviceable proverb in one language passed into any other that stood in need of it; and this makes it a matter of diffiency, or rather impossibility, to settle the nationality of many of them. We are not, however, to reject entire to the conclusion that proverbs which are identical or nearly so must be in every instance merely versions or variants of one common original. To take an extreme case, our old friend the swallow that flies south in winter is current now on six continents, has been in many versions, and was current before the 2000 years ago, a date which allows ample time for it to have penetrated into the remotest corners of Europe. But it does not by any means follow that none of these came into existence independently. The
remark is one which must have been made at first hand in many a tongue on many a spring day. 'Summer!' cries the young man, 'Lo, a swallow!' 'Nay,' says the old one, with that repressiveness of youthful optimism which is the privilege of age, 'One swallow, &c. But undoubtedly in most cases of the kind, the expression is nothing more than the side of a common ancestor. It is not easy, for instance, to see how that about the gift-horse's mouth, which was, as we know, 'a vulgar proverb' in the time of St Jerome, could ever have been independently produced. That two minds should have thought of the same words in the same sense is altogether too much to hope for in the case of a proverb, and the same thought may be within the bounds of possibility, but that in each case a proverb should be the fruit of it pushes the coincidence to the utmost limits of chance.

It is obvious that the greater number of these proverbs which seem to have a common property must be of eastern birth. If we find a proverb in English, German, Italian, and Spanish, and also in Arabic, Persian, and Hindustani, which is the more likely—that it has passed from Europe to Asia, or from Asia to Europe? Distribution argues antiquity, for necessarily the proverb travels slowly; and, go back as far as we may, we find the proverb, the fable, and the parable working together in the East. When David appealed to Saul it was with a proverb of the ancients, and in the history of the Mourners 'judge not that ye be not judged.' The straw in another's eye than thee, but not the beam in thine own,' and others, are still current in Syria. 'One sow's and another reaps' and 'Who makes a trap for others falls into it himself' are Turkish, and 'Where the corpse is buried the worms will be' is a Bengal proverb. The proverbs that are strictly national have an interest of another kind. Coming directly from the people, the chosen vehicles of their sentiments and opinions, they naturally reflect the habits of the country, the climate, the soil, the way of life, the tastes, the customs, and the sentiments of those who use them. Any one at all versed in comparative etymology will be able for the most part to make a shrewd guess at the original language from a translated specimen. They reflect other things too—often the history of the nation they come from. Proverbs are the Spaniard, as he was before Ferdinand and Ximenez brilled Aragon and Castile, makes himself heard in 'The king goes as far as he may, not as far as he would;' there are Teutonic proverbs older than Luther, in which his very spirit seems to speak; there are Italian proverbs that, in their cynicism, distrust of mankind, and open advocacy of lying, are more eloquent on the state of society in medieval Italy than any of her historians. And the differences they suggest are often curious. The devil figures prominently in the proverbs of Europe; but in South India and the South Sea Islands he is an absent figure, with respect, or at any rate credited with astuteness, the only exception, perhaps, being the Italian one that accuses him of weaving a coarse web. In Teutonic proverbs, on the other hand, he is held up in the light of the wit for he is a laughing simile. He tries to get wool off his pigs; he makes a donkey for a cow, and remarks how soft its horn is; he sits down on a swarm of bees, because there where is singing going on one may make one's self easy; and so on through a host of proverbs.

Of the national groups the Spanish is unquestionably the most remarkable. The number of Spanish proverbs is prodigious. In any other language 5000 or 6000 would be a large collection, but a Spanish MS. by Yriarte, the Royal librarian, which was in the Heber library, contained between 25,000 and 30,000, a number which, however incredible to others, is not at all surprising to those who know the proverbs in the Spanish tongue and the people and the language. In Spain almost everything has its proverb; every village of the plain, every herb of the field, has its virtues or vices put in a comical sentence for general circulation. And they are as racy as they are numerous, full of shrewd sentiment, and remarkably well calculated to be rich in that grave, dry Spanish immobility which never compromises itself by a descent into facetiousness. The Spaniard is, no doubt, naturally sentimented, but the facilities offered by his rich, sonorous Castilian, should not be overlooked; and among them there is richness and wealth in rhymes, consonant and assonant, of which there is such striking proof in the number and excellence of the Spanish rhyming proverbs. Language, it may be observed, plays an important part in proverbs. Take, for example, the proverb, 'In a man's house than an ill tenant.' Compared with the English 'empty,' how much more effective is the Scandinavian 'toom,' to say nothing of the alliteration or inverted rhyme. The Basque proverbs, from which several of the Spanish are obviously derived, are the most florid and the most ornate. There is truth in both, but especially in the Basque, the resemblance to the proverbs of the East is very distinct. The Basque proverbs have not been as carefully collected as they deserve, and of course form only a small group; but, relatively to the Basque-speaking population of a little over half a million, their numbers indicate a propensity to the use of the proverb as strong as the Spanish. The Italian proverbs, only less numerous than the Spanish, are more remarkable for wit, often bitter, than for humour; in the French, on the other hand, there is little or none of that brilliant wit and epigrammatic neatness of expression which distinguish French literature. But this is only what might be expected. French wit is the product of French culture, and proverbs are natural productions of the people, and, including French and Scotch, must be regarded as simply a subdivision of the great Tentoic group comprising the German, the Plattdeutsch, the Dutch, the Danish, the Swedish, and the Norwegian. Each of these, of course, its own peculiar proverbs, but in each case the main body, it will be seen on comparing them, belongs to a common stock. Next to Spain, the region richest in proverbs in Europe is probably that watered by the lower Elbe, and including Oldenburg, Hanover, Holstein, and Mecklenburg—the Anglo-Saxon country, in fact. Compared with other groups, the Celtic proverbs must be rated as poor. The Gaelic proverbs, as Nicol- son's admirable collection shows and he himself admits, have been largely recruited from Norse and Lowland Scotch sources; and the purely Celtic are to a great extent made up of sayings in praise of Cingul, or on which our Hibernian counties has had another, or of itself. The Welsh proverbs gathered by Howell are very flat; and of the Irish Dr Nicolson observes that the wonder is they are so few, and those few so remarkably deficient in the wit for which our Erinian country is especially distinguished—a remark certainly borne out by the specimens usually given, in which moral truisms of the copy-book order, like 'Virtue is everlasting wealth,' 'Wisdom excels all riches,' 'Falling is easier than rising, have a decided pre-dominance. Other small groups, the Lusitanian, Greek, and Arabic hold the first place in respect of quantity, and perhaps quality likewise, but the Persian and
Hindustani are also excellent, and in the Turkish, together with abundant worldly shrewdness, there is sometimes a vein of poetry that is very striking. It is, however, a very beautiful language, and use Trench's phrase, of our own proverb of the proverb is not rivalled by its Turkish parallel, 'God makes a nest for the blind bird.'

The bibliography of proverbs is, of course, a subject which cannot be compressed within the limits of an article. Even the admirable work of M. Duplessis, Bibliographie des Proverbes (Paris, 1847), fails to be outgrown by the proverb literature that has sprung up since its appearance; and Nipotsitz's Literatur der Sprichwörter (Nurnberg, 1853) is still more out of date. The only complete and systematic list of proverbs, that is to say, not aphorisms or maxims of sage-saying, probably the French Proverbes variés et vulgaires and Proverbes au Villain, a significant title as indicating the recognised source of proverbial wisdom. Both of these are of the 19th century, and there are one or two others of the same sort almost as old. The Marquis of Santillana, the Spanish poet, statesman, and soldier, is the oldest collector of proverbs of whom we know anything. His collection of 625 'Proverbes,' after Agricola and Franois, are worth repeating as the first written record of the French proverb. It was made at the request of John II, of Castile about the middle of the 15th century, but was not printed till 1508. The earliest German collections were those of Johann von Wurzburs, and Johann W. Franck in 1561, for Gebel's 'Proverbia Germanica' (1568), being in Latin, cannot be counted. Of Italian proverbs the first genuine collection was the Proverbi di Antonio Cervazzano (Venice, 1483), a comparatively little work, and probably the most valuable, of the great collections that have been paid to our debt. John Heywood, the dramatist, in 1546 composed a verse A dialogue containing in effect the number of all the proverbs in the English tongue, which is preserved in W. C. Hazlitt's (2nd ed. 1882). Scotch proverbs have fared better. A collection by David Ferguson appeared in 1641, and a much larger one by Kelly in 1721, followed by I. Macfarlane in 1826. Macdonald's was published in 1832, and Halliday's in 1862. The collection of Gaelic proverbs was made by Donald Macintosh in 1785, and a more complete one by Alexander Nicolson in 1852. T. Trench's Lexicon in Proverba (1853) somewhat removes the poverty of English proverb literature.

In strong contrast to English neglect is the zeal of German collectors. Goethe enumerates seventy-five names, and Duplessis more than thirty that number of works. A few of the more noted, after Franck, Lehmann, Politischer Baumgartn (1630); Siebeneck (1790); Wander, Schredsulse (1823) and Schrösierter Lexicon (1867); Korte (1837); Eiselein (1849); Simons, Grammatica, Sprechwort, Schrösierter Lexicon (1869); Binder, Schrösierter Teutsch (1873); Schröder, Plattdeutsche Schrösierterwortschatz (1875); Rheinberg, Düringsfeld, Schrösierter der Germanischen und Romanischen Sprachen (1872-75). The last is probably the most masterly work on proverbs ever written. It is not so much a collection as a concordance of proverbs, in which more than 1700 are traced through all the Teutonic and Romance languages. He has collected and most chief French collections are Proverbes Communes (16th century); Lebon, Adages and Proverbes de Solon de Vogue (16th century); Meurrier, Traité des Sceptiques (1617); Duhamel, Petit Dictionnaire de Proverbes (1749); Tuet, Matrins Sémantiques (1789); Le Roux de Lincy, Livre des Proverbes Français (1859); the best; over- elaborate in arrangement, but

valuable for its introduction and appendices); Ohnenart, Proverbes Basques (1857; reprinted 1847); Sauvé, Proverbes des Diables Bourguignons (1784); Lepuy, Proverbes du Pays de Beauvais (1785); T. F. Gobert, Proverbes du Nord (Nice, 1878).—Italian: Cinzio, Proverbi (1856); Pasteci, Proverba Italiana (1858); Giusti, Proverbi Toscani (1839); Bini, Proverbi Tradotti (1855); Palmarin, Proverbi Emiliani (1875); Palmarin, Proverbi Stilizzati (1875); Taracchi, Proverbi di Guzman, Proverbi or Proverbi (1555); Mallara, Dizionario Vulgar (1568); Palmarin, El Estudio Cortesano (1575); Osuna, Proverbi Castellanos (1605); Cervantes, Proverbi de Guzman (1575); Proverbi de la Lengua Castellana (1518, from the Dictionary of the Academy); Collins, Dictionary of Spanish Proverbs (1822); U. R. Burks, Spanish Sót (1877); the proverbs in Don Quixote; Haller, Alte spanische Sprichwörter (1838).—Portuguese: Adéus, Proverbos, (1780-1840).—Dutch: Harrebomme, Spruchwoorden (1858-63).—Danish: Mobberke, Danske Ordsprog (1825); Koks (1879); Grundtvig (1875).—Swedish: Ruternders, Gumbo Ordsprö (1840); Svenska Ordsprokkboken (1865).—Norwegian: Assen, Norske Ordsprog (1856).—Lidjan, Dr H. Scheying (1847).—Finnish: J. H. Pohjola, Suomalaisia Proverbiuutia (1841); Negri, Dizionario of Modern Greek Proverbs (1834).—In Arabian: There is a collection in appendix to Duplessis (1847).—Arabic: Sealiger and Esenpinius, Proverborum Arabicum Centuria (Venice, 1641), followed by Schiller, Araborum Proverbiarum (1830); ed. by Freytag, Proverbia (1838-43).—A. A. G. M.-P., Vergilius, De Proverbiis et Distichs de la Province de Syria (1833).—Persian and Hindustani: Rushbeck, (1849).—Bengali and Sanskrit, Partha (1832).—Bahasa: Deutsch: Descamps, Mille Proverbes en Proverbes (1872); Germanisch Proverbi (1847); Osmannische Sprichwörter (1865); K. K. Orient. Akad., Wien.—Chinese: Hau Kiu Cho-on, or the Chinese Proverbs (1874), contains a small collection.—Japanese: Sonekawa and Ueda Tokumon, Cost Proverbes Japonais (1884).
thirty-two moral precepts, six of which are distichs, seventeen in four lines, and the others of various forms, including a discourse or mashal of some length against drunkenness (xxii. 29-35). An exposition to headdings the collection is prefixed (xxii. 17-21). (4) xxiv. 23-34 is superscribed 'These also are sayings of the wise,' and contains six sayings or precepts of a somewhat trite order, including, however, the familiar description of the sluggard and his vineyard. (5) xxx. 1-xxix. 27 has the heading 'These also are the proverbs of Solomon, which the men of Hezekiah, king of Judah, copied out.' Of the total number (197) 114 are distichs, six in four lines, and the rest irregular. This collection is generally considered by critics to contain more elements of high antiquity than the rest of the book, and is specially distinguished by the vigour, freshness, and originality of its observations and expressions. (6) xxx. consists of twelve sets of verses of various import, including some riddles of the Hebrew type. The somewhat obscure heading ought probably to run 'The words of Agan the son of Jakeh of Massah.' (e.g. Gen. xxv. 14; 1 Chron. 1. 30, 40, 38.) and the opening verses to be read (as in R.V. margin) 'The man said, I have wearied myself, O God, I have wearied myself, O God, and am consumed, for I am more brutish than any man, and have not the understanding of the virtuous woman.' It is of interest to observe that the expression of a spirit that has exhausted its energies in the effort to reach a true knowledge of God, (7) xxxi. 1-9, 'The words of Lenneal, king of Massa' (see above), wherewith his mother instructed him, a warning against wine and women, and an exhortation to righteousness. (8) xxxi. 10-31, an alphabetical piece without superscription, consisting of twenty-two distichs in praise of the virtuous woman—i.e. the wise, energetic, capable housewife. There are no data that enable us accurately to determine the relative ages of the sixteenth portions. It seems not unreasonable to suppose that the book may have been brought into its present form by the writer of the first part (i.-ix.). It is not improbable that the book contains individual utterances of very great antiquity—as old as, or older than, the author himself—but it is impossible to pick out these with certainty. There is no good reason for identifying the main collection (x. 1-xxv. 16), consisting as we have seen of 376 mashals, with the 3000 proverbs of Solomon mentioned in 1 Kings, iv. 32, though this has been done occasionally; that the first two chapters were not before the compilers of xxx. 1-xxix. 27 is evident from the number of doublets contained in the latter series (e.g., for example, xxx. 24 and xxv. 9; xxxi. 13 and xxxi. 13; xxxv. 15 and xxxv. 14, and numerous other instances). It is probable that the present book was a slow and gradual growth; and that the process may have been carried on to a very late date is shown by the considerable variations between the Masoretic and Septuagint texts.

For a good account of the Book of Proverbs, with reference to the literature of the subject, see Reuss, Gesch. d. heil. Schriften Alters Testamentes (1890). The most convenient commentaries are those of Hitzig (1858), Bertheau (1847; new ed. by Nowack, 1883), and Delitzsch (1873; Eng. trans.). See also The Speedwell's Commentary, and a homiletical work by Horton (1891).

Providence, a seaport and the semi-capital of the state of Rhode Island, the second city of New England and the twentieth in order of population in the United States, is situated at the head of navigation on an arm of Narragansett Bay, known as Providence River, 35 miles from the ocean and 44 miles by rail SSW. of Boston. It covers a wide area on both sides of the river, which, above its two bridges, expands into a cove, a mile in circuit, on the borders of which is a handsome park, shaded with noble elms. It is a city of large commerce, manufactures, and wealth, abounding with beautiful villas and gardens. Founded before the colonial type of American cities had been discovered, it has street plans peculiar to the site singularly uneven, rising in one place to 204 feet above high-water; and in one ward, much of which is still in farms, there are numerous hills and valleys. Among the many notable public buildings are institutions of Providence and the city hall, of granite, which cost upwards of $1,000,000, and has facing it the state's soldiers' monument; the state-house; the custom-house and post-office; the Athenæum, and the buildings of the Rhode Island Historical Society; the theatre and the Butler Exchange; a great number of churches, schools, and libraries, hospitals and asylums, including a noble charity known as the Dexter Asylum for the Poor; the Friends' Boarding-school (popularty, 'the Quaker College'); and Brown University, a Baptist institution, founded in 1764, and amply endowed: it has about 300 students, and ranks among the leading colleges of the United States. The city has lost most of its foreign trade, but instead it has become one of the great manufacturing centres of the country; two small rivers afford abundant water-power. The chief establishments are engaged in making engines, locomotives, corsets, and American woolens, cottons, and woollens, cheesecakes, shoe-laces, lamp-wicks, &c.; and besides there are scores of manufactories of jewellery, many bleaching works, &c. Providence was settled in 1636 by Roger Williams, Pop. (1870) 65,904; (1880) 104,857; (1890) 132,146; (1900) 175,597.

Province (Lat. provincia), a territory acquired by the Romans beyond the limits of Italy, and governed by a Roman Procurator (q.v.) or procurator, or by a proconsul (see CONSUL). The senate decided which provinces were to be praetorian and which consular. As a rule the provinces were unmercifully plundered by the governors and the tax-collectors (publicani). Under Augustus there were twelve imperial provinces, requiring military occupation, and under the emperor's immediate control, and ten senatorial provinces, entrusted to senatorial governors (see SENATE). The provinces of France (q.v.) were superseded at the Revolution by the departments. The great governmental divisions of India, Canada, and other countries are often entitled provinces. The sphere of duty of an Archbishop (q.v.) is his province, usually consisting of several ecclesiastical dioceses. The cathedral provinces of France (q.v.) were superseded at the Revolution by the departments. The great governmental divisions of India, Canada, and other countries are often entitled provinces. See General, Monachism.

Provin, a town of France (dept. Seine-et-Marne), lies 15 miles S.E. of Paris, on the remains of ancient walls, and overlooking the Banks of the Marne. The most interesting feature is an ancient tower, built in the 12th century, vulgarly called Caesar's Tower. The vicinity was long famous for its roses, and they are still cultivated to a considerable extent. There are numerous flour-mills and dye-works. Pop. 7888.

Provisional Order is an order granted, under the powers conferred by an act of parliament, by a department of the government, by the Secretary of State, or by some other authority, whereby certain things are authorised to be done which would be accomplished otherwise only by an act of parliament. The order does not receive effect, however, until it has been confirmed by the legislature. Till that time it is purely provisional; and even after it has been so confirmed and is in reality...
an independent act, it retains the title of a provision order. Provisional orders are most useful in facilitating the modification or extension of the provisions of general acts, so as to adapt them to the special necessities of particular districts. They may be obtained with much greater expedition and less cost than a private bill; the confirmatory act when adopted may be obtained in a week or two, and has all the facilities of a government measure.


Provisors, Statute of. The object of this statute, passed in the reign of Edward III. (1350), was to correct and put an end to the abuses which had arisen in the exercise of the patriarchal prerogatives as to the disposal of benefices in England. See England (Church of), Vol. IV. p. 337.

Provo City, capital of Utah county, Utah, is on the Provo River, between Utah Lake and the Wasatch Mountains, and 46 miles by rail SSE of Salt Lake City. It contains flour-mills, tanneries, &c. Pop. (1900) 6185.

Provoest (Lat. prepositus, 'set over'), in Church Law, the chief dignitary of a cathedral or collegiate church, who may use the title of provost, and who may also be transferred to the heads of other bodies, religious, literary, or administrative. The name is also given to the superiors of certain religious houses of lesser rank, and the relation of which to the more important houses is analogous to that of the provost to the abbey. The head of a cathedral chapter was anciently the archdeacon. Present, in the Roman Catholic Church, cathedral chapters are presided over by provosts in Austria, Prussia, Bavaria, and England, but in other parts of Germany and in France by deans. In the latter case, the provost is the Dean, i.e. the chief officer of a cathedral; but the title of provost survives, alongside that of dean, in the Scottish Episcopal Church. In the Protestant Church in Germany, in the north especially, where several minor churches or chapters are attached to one chief church, the minister of the latter is called provost (profeet). In England the heads of Oriel, Queen's, and Worcester colleges in the university of Oxford, and the head of King's College, Cambridge, are designated provost. The head of Eton College is also so called.

Provoest-marshal, in the Navy, is a person appointed to have charge of a prisoner before a court-martial, and until the sentence of the court is carried into execution. In the British Army the provost-marshal is an officer, appointed only abroad, to superintend the army. The head of the army category of any particular camp or district. He has cognisance of all camp-followers, as well as members of the army. Under the Army Act of 1881 he cannot as formerly inflict any punishment of his own authority, but may apprehend a offender and bring him before a court-martial. It may then be his duty to see the sentence of the court carried out.

Proxy (contracted for Procuracy), the agency of one person who acts as substitute for another. Every member of the House of Lords was formerly permitted, on obtaining a nominal license from the crown, to appoint another lord of parliament his proxy to vote for him in his absence. Only a spiritual lord could be proxy for a spiritual lord, and a temporal for a temporal lord, and no peer could hold more than two proxies at the same time. Proxies were never used in judicial business, or in committees of the House, nor could a proxy sign a patent. The practice of submitting proxies was discontinued in 1867. Shareholders in joint-stock companies may vote by proxy. Formerly, principal persons were sometimes, for reasons of state or convenience, represented by deputy at their own marriages; but marriage by proxy is not recognised by the law of England. See Marriage, Vol. VII. p. 58.

Prudentius, Marcus Aurelius Clemens, the most important of the Roman Christian poets, was born in the north of Spain in 348 A.D. Nothing is known regarding him except what he has himself told in a poetical autobiography prefixed to his works. From this we learn that he received a liberal education, practised as a pleader, discharged the functions of civil and criminal judge, and was ultimately appointed to a high office at the imperial court. His religious convictions came late in life, and he devoted the evening of his days to the composition of religious poetry. The year of his death is fixed at 398 A.D. Of his poems the chief are (1) Cathemerinon Liber, a series of twelve hortatory hymns, the first half for the different hours of the day, the latter half for different church seasons (Eng., trans. 1845); (2) Peristephanon, a collection of fourteen lyric poems in honour of martyrs (Eng., trans. 1845); (3) Apophthegmata, a defence of the doctrine of the Trinity against heretics; (4) Hamartigeneia, on the Origin of Evil, a polemic, in verse, against the Marcionites; (5) Psychomachia, on the Triumph of the Christian Graces in the Soul of a Believer; (6) Contra Symmachum, the first book a polemic against the heathen gods, the second against a petition of Symmachus for the restoration of the altar and statue of Victory cast down by Gratian; (7) Diaryon, a series of forty-nine hexameters, arranged in four verses, on scriptural incidents and personages. Bentley calls Prudentius 'the Horace of the Christians,' and others of the Latin poets, yet he be true enough if the critic only meant to say that he is the first of the early Christian verse-makers. See the article HYMN, Vol. VI. p. 46.

Editions are by F. Areval (Rome, 1788), reprinted in Migne's Patrologia, i. 532; Oebler (Fulbing, 1845); and Dressel (Leip., 1860). See Brehm, A. Prudentius (1872); Ebert, Geschichte der christl.-latein. Lnt. (vol. I, 1874); Pagner, De A. Prudentii Clementii Carmina, legis et alia (1885); and F. St John Thackeray, Translation from Prudentius (1886), with an excellent introduction to his life and works, language, metre, and style.


Prunella. Skeat defines this material as 'a strong woolen stuff, originally of a dark colour,' Vr. prunell, 'a sloe,' whence prunella in a Latinised form, now this word is chiefly from Pope's fine lines (Essay on Man, iv. 204): 'Worth makes the man, and want of it the fellow.' The rest is all but leather or prunella.

To which passage, in the Globe edition, Mr Ward adds 'because clergymen's gowns were often made of this kind of stuff.'—The name Prunellc is also given to a genus of plants of the natural order Labiatae. Several species are natives of Europe; one only is found in Britain, P. vulgaris,
PRUSSIA

1,756,802
1,404,360

bounded
the
the
E.
France,
the
almost
obtained
is
11,762
circum-
26
is
2,698,649
Texas.
4720
is
15,260
11,311
indeed,
W.
forms
by
461
29x601
able
ami
doniestica),
popularly
or
nanibers
taste
which
dangerous.
removetl
pleasure-ground,
be
of
frequently
the
other
branches
eight
utmost
berry
the
trees
plums
the
Pruning,
moist
ornament.
slightly
timlter

young
repute
must
be
pruning
to
orchards
a
pruning
to
trees
from
a
pruning
the
young.
In
growth.
fruit
have
for
producing
producing
the
chiefly
cherries
producing
Prussia

PRUNES
are dried fruit of the plum-tree (Prunus domestica), of the variety called Juliana, largely prepared in France, and exported thence. Great numbers come also from Bosnia and Servia.

Pruning, the removal of branches from fruit or forest trees, in order to the greater production of fruit, the improvement of the timber, or purposes of ornament. In pruning for ornamental purposes, the tangles must he consulted, but reference must be made to what has been too little regarded in pruning of every kind—the nature or habit of the tree itself.

Some trees will bear clipping into fantastic forms, which would be utterly destructive of others. Such forms, once esteemed, are the most ornaments of a pleasure-ground, or the neighbourhood of a mansion, are rejected by the simpler taste of the present age, and the 'topiarist art' has few admirers. Much may be done, however, by the removal of branches to give a finer form to ornamental trees; but in the largest of the oaks, and of evergreen trees, of any apt of their timber, a great mistake is very generally committed in permitting branches to grow to a considerable size before they are cut off. It may be accepted as a general rule that the branches removed should be small in proportion to the bulk of the tree. The removal of twigs and small branches is attended by no bad effects, and may be beneficial; but the removal of large branches is dangerous. The leaving of stumps or snags is an aggravation of the evil. They rot away and spoil the timber of the stump; indeed, a hole is not an
frequently formed, which may eventually lead to the rotting of the whole of the interior of the trunk of the largest oak. But in the case of forest trees pruning may with advantage be in great part avoided, by taking care to plant at proper distances, and thinning out the plants sufficiently in early periods of their growth. In this way better timber is obtained and a greater produce from the land.

Pines and firs scarcely ever require pruning, and are probably in almost all cases the worse of that which they get, except in the removal of diseased lower branches. In other trees it is sometimes of importance to watch for branches that would divide the trunk, and to prevent the division, causing the main stem to ascend higher before it forms a crown; but to be of any use this must be done whilst the branches are still very young. Plantations should therefore be examined with a view to pruning, at intervals of not more than two years, after they are six or eight years old.

In orchards and fruit-gardens pruning is necessary, the object being not to produce timber, or the utmost luxuriance of trees, but fruit in the greatest perfection and abundance. The habits of each kind must be studied. Even in the pruning of gooseberry and currant bushes regard must be had to natural diversities, the gooseberry and black-currant produce fruit chiefly on spurs from older branches, and so is it amongst trees; apricots, for example, producing fruit chiefly on young wood, cherries mostly on spurs, whilst plums produce both in the one and in the other.

The object of the gardener in pruning is to bring the tree into the condition best suited for producing fine fruit and in the greatest abundance; and to this the training of wall trees must also be accommodated. Sometimes, in order to produce particularly fine fruits for the improvement of the variety by seed, or for the sake of a prize at a horticultural exhibition, the gardener diminishes the number of branches likely to bear fruit beyond what would otherwise be desirable.

The general seasons of pruning are winter and spring; but some trees, particularly cherries and all other drupeaceous fruit trees, are advantageously pruned in summer, as they then throw out less gum.

Pruning instruments are of various kinds—knives, axes, saws, bills of very various forms, &c.; and the averrucator, which may be described as a pair of scissors, one blade hooked or crooked, attached to a long handle, and working by a cord and pulley. It is scarcely except for standard trees in gardens and orchards.

Prurigo is the name applied to a group of diseases of the skin, characterised by the presence of papules, scarcely distinguishable in colour from the normal skin, and so 'felt rather than seen,' accompanied by intense itching. One form of the disease, prurigo scabies, is met with in old people in consequence of the irritation caused by lice, and disappears when these are got rid of. In its most characteristic form, however, it almost always begins in childhood, and may persist through life; even when the irritation of the lice is got rid of it, it is apt to recur. It chiefly affects the trunk and extensor surfaces of the limbs, and is worst in winter.

The disease is aggravated by the scratching from which the sufferer cannot refrain, and the skin becomes thickened and often ecaenomatous as well. Warm baths and soothing ointments are the good feeding, cod-liver oil, and arsenic or quince are generally found to give great relief, and often cure the disease entirely.

PRUSSIA (Ger. Preussen), by far the largest and most important state in the German empire, is a kingdom embracing nearly the whole of northern Germany. It is bounded N. by the German Ocean, Jutland, and the Baltic; E. by Russia (and Russian Poland); S. by Austria, Saxony, the Thuringian states, Bavaria, Hesse-Darmstadt, and Alsace-Lorraine; W. by Luxemburg, Belgium, and the Netherlands. Prussia owns lies in Hessen, Holstein (q.v.) and about thirteen other smaller exclaves or detached territories lying within the bounds of other German states. The total area is 136,000 sq. m. with (1885) 31,855,123 inhabitlants—i.e. nearly two-thirds of the entire German empire, with about one-third of the population, equal to about one and one-tenth the size of the United Kingdom, or one-half of the state of Texas. The frontier line has a circumference of 4720 miles, of which 1025 miles are coast-line (770 miles on the Baltic, 255 miles on the German Ocean). The following are the provinces into which Prussia is divided:

<table>
<thead>
<tr>
<th>Province</th>
<th>Area in sq. m.</th>
<th>Pop. in 1900</th>
<th>Pop. in 1905</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Prussia</td>
<td>14,445</td>
<td>1,903,938</td>
<td>2,006,689</td>
</tr>
<tr>
<td>West Prussia</td>
<td>9,004</td>
<td>1,458,898</td>
<td>1,474,560</td>
</tr>
<tr>
<td>Berlin</td>
<td>1,725</td>
<td>1,260,012</td>
<td>1,291,128</td>
</tr>
<tr>
<td>Brandenburg</td>
<td>15,560</td>
<td>2,956,828</td>
<td>3,221,698</td>
</tr>
<tr>
<td>Pomerania</td>
<td>11,762</td>
<td>1,540,634</td>
<td>1,574,145</td>
</tr>
<tr>
<td>Wessi</td>
<td>11,524</td>
<td>1,407,137</td>
<td>1,439,708</td>
</tr>
<tr>
<td>Silesia</td>
<td>15,743</td>
<td>4,907,950</td>
<td>4,915,309</td>
</tr>
<tr>
<td>Saxony</td>
<td>9,565</td>
<td>1,924,007</td>
<td>1,988,546</td>
</tr>
<tr>
<td>Slaviock-Hostel</td>
<td>7,532</td>
<td>1,127,372</td>
<td>1,286,792</td>
</tr>
<tr>
<td>Hildigrad</td>
<td>15,051</td>
<td>2,153,169</td>
<td>2,392,829</td>
</tr>
<tr>
<td>Hanover</td>
<td>7,592</td>
<td>2,943,445</td>
<td>2,701,420</td>
</tr>
<tr>
<td>Westphalia</td>
<td>11,293</td>
<td>1,854,576</td>
<td>1,756,802</td>
</tr>
<tr>
<td>Rheinisch</td>
<td>10,545</td>
<td>4,682,963</td>
<td>4,750,892</td>
</tr>
<tr>
<td>Holstein</td>
<td>447</td>
<td>67,024</td>
<td>65,792</td>
</tr>
<tr>
<td>Total</td>
<td>316,076</td>
<td>37,279,111</td>
<td>38,855,123</td>
</tr>
</tbody>
</table>

Omitting Berlin and Hildigrad, the density of population ranges between 181 (1868 Prussia) and 452 (Rhenish Prussia) per sq. m. About one-fifth of the present area of Prussia has been acquired
since 1833, the largest grains being made after the war of 1812. The peninsula, more than two-thirds of its total area, belongs to the north European plain, while less than a third, chiefly in the south-west, can be described as hilly or mountainous. The division between the two districts is roughly indicated by an irregular series of heights beginning with the Harz Mountains, then the Hunsruck, the Ems, and the Weser Hills, on both sides of the upper Weser, and thence running towards the south-east in the Harz Mountains (q.v.), with the Braecken (3740 feet), and in the northern outliers of the Thüringerwald (Finstenberg, 3100 feet; Inselsberg, 3000 feet). Further to the south-east this line of heights is continued by the Riesengebirge (q.v.), separating Prussian Silesia from Bohemia, and forming the northern ranges of the Sudetic system. None of these ranges rise above about 5000 feet; the Schneeckuppe (3290 feet) in the Harz Mountains, the Hohe Gaisberg, 3000 feet, in the Thüringerwald, and the Hunsruck, with an average height of 1200 to 1500 feet, and farther south is the Harz, the latter of which is given to the northern extremity of the Vosges. On the east side of the Rhine the Saarland, between the Ruhr and the Sieg, with the Rothaar or Rotlagergebirge, is succeeded farther south by the Westerwald (Fuchskaften, 2155 feet), between the Sieg and the Lahn, and by the Taunus (Feldberg, 2853 feet), between the Lahn and the Main. To the south of the Taunus, famous for its mineral springs, lies the fertile Rhine valley, and while to the north of the Vosges, chiefly, however, in Hesse, forms a link with the Hohe Rhön (Wasserklippe, 3115 feet), which may be regarded as an outlier of the Thüringerwald. The soil is generally poor in these districts, though they possess special sources of wealth in their iron and coal mines. The level country between the Rhine and the Maas, bordering the Eifel, is, however, extremely fertile; and Hesse-Cassel is particularly fruitful, cereals of all kinds growing abundantly. The great northern plain, which occupies the rest of the kingdom, is varied by the numerous lakes, especially in the east, on which the Oder, Bóbr, and other rivers of the district are described under GERMANY (Vol. V. p. 172). The surface is diversified with numerous lakes, especially in the east, on what are known as the Pomeranian and East Prussian Lake-plates, but none of them is more than 20 sq. m. in area, though altogether the number of these covers more than 600 sq. m. in area. The soil, consisting chiefly of loose sand interspersed with a large number of erratic blocks of granite, is sterile, covered in many places with heaths and belts of stunted pines. On the northern slope, terminating on the shores of the Baltic, there are numerous lakes, many of them small, along both rivers which have been carefully embanked, as the Niemen and the Vistula. The southern elevation of the Prussian plain, running between the Polish mountains of Sandomir in the south-east and the

Elbe between Magdeburg and Bamburg in the north-west, attains a height of about 1000 ft. above the Breslau on the Oder, where it is known as the Teubnitz Heights. Its general character is more fertile than the northern elevation; while the country between the two is, for the most part, extremely sterile. It includes the sandy waste in which Berlin, the capital, is embedded, Situated on this tract, and in Silesia and Prussian Saxony, the country is fertile, including some of the most productive grain-growing districts of Prussia. Hanover has much the same character. Great marshes or peat-moors cover the north and north-west districts; but the chief rivers, the Oder, Vistula, and Weser, and their tributaries, which flow in the south are often fertile, and well adapted for agriculture. The coasts are low, and require to be protected from the overflowing of the sea by embankments and dykes. Sleswick-Holstein, to the north of the Elbe, is in part sandy and heathy, like the plain of Hanover, but it has also numerous marshes.

Rivers.—The northern plain is watered by five large rivers—the Niemen, Vistula, Oder, Elbe, and Weser—all of which rise beyond the borders of the kingdom, and the Pregel, Elder, and Ems, which are exclusive to the kingdom and enter it from Prussia. The chief river is the Rhine, which enters Prussia at Mainz, and thence flows north through a narrow valley noted as one of the most picturesque parts of Germany. The Rhine, which is navigable throughout its entire course in Prussian territory, receives numerous tributaries—such as the Lahn, Wied, Sieg, Wupper, Ruhr, Lippe, Berkel, and Vechte, on the right, and on the left the Air and the Moselle or Mosel, the latter of which is navigable for more than 150 miles within the Prussian dominions. The Weser, Elbe, Oder, and Vistula, as also the Sorce and Spree, are navigable, receiving, however, a great part of their water from the chief rivers of north Germany, the most important are the Bromberger, the Finow, the Friedrich-Wilhelms, the Elder, and the Kaiser-Wilhelm canals.

Climate.—The climate of Prussia presents great differences in the eastern and western provinces, the former being exposed to heavy snowstorms in winter and great drought in summer, while the latter have milder winters and a greater rainfall. At Berlin the annual mean temperature is 48° F.; on the Rhine it is 49° (summer, 63°; winter, 34°); in the east provinces and among the mountains it is below 45° (summer, 61°; winter, 28°).

Productions.—Agriculture and the rearing of cattle constitute the principal sources of employment and wealth of the rural population of the entire monarchy, and the state has hitherto directed its unremitting attention to the furtherance of the one and the encouragement of the other. It has endeavored to discourage land-taxes, advancing money to landowners, encouraging agricultural institutions, introducing approved breeds of animals and improved farm instruments, &c. Rather less than one-half, or 12,000,000, of the population of the kingdom are engaged in agriculture. The most important crop is wheat, which covers more than 3000,000 acres. Of the total area 50 per cent, is occupied by arable land, 94 per cent, by meadows, and 11 per cent, by pasture. Large estates, as a rule, are only to be found in the eastern and least populated provinces of the monarchy. Rye, wheat, oats, barley, peas, maise, and other grain are almost everywhere extensively cultivated. The finest grain districts are the Börde, near Magdeburg, the low lands on the Wartha and Netze, and on the Rhine and Mulde.
lakes, the north-eastern parts of Pomerania, the island of Rügen, the valleys of the Oder in Silesia, of the Saale, Moselle, Saar, and parts of Hesse-Nassau. Magdeburg is the centre of the beet-root sugar industry. Western Prussia is noted for its excellent fruits and vegetables, and its provinces stand pre-eminent for their wines, Nassau being specially famous for its Rhine wines. The forest lands, which are chiefly in East Prussia, Posen, Upper Silesia, Westphalia, Southern Hanover, and Hesse-Nassau, are of great value and considerable extent, occupying an area of 10,000,000 English acres. The mineral products of Prussia include coal, iron, lead, zinc, copper, cobalt, antimony, manganese, arsenic, sulphur, alum, nickel, black lead, baryta, gypsum, slate, line, freestone, salt, amber,agate, jasper, onyx, &c. Prussia yields about one-half of the annual zinc production of the world; and of the total output of coal in Germany, about three-eighths of that of the United Kingdom, Prussia produces 93 per cent. The chief coalfields are in Silesia, Westphalia, and Rhenish Prussia, which are at the same time the chief industrial and mining kingdom of the empire. The region of the Harz in Hanover is also famous for its mining industries. All metals, salt, precious stones, and amber found along the Prussian coast from Danzig to Memel belong to the crown. Prussia has unimportant deposits of copper, for which the iron-ore and efficient are the sulphur baths of Aix-la-Chapelle and Ems; the iron springs of Schwabach, Willemsbad, Driburg, and the hot and saline baths of Reinerz, Landeck, Flinsberg, Freienwalde, Lauchestett, Wiesbaden, Schlangenbeul, and Freiburg. Iron ore is used for its royal studded, and the excellent breed of horses which it now raises, and of which large numbers are annually exported. Westphalia enjoys a special reputation for the excellence of its hams and pork, Pomerania for its smoked geese, and Brandenburg and Hanover for honey and wax. Fish of all sorts are abundant in the rivers and numerous lakes; seals are taken in the Baltic. The wooded districts abound in game of every kind, pheasants, partridges, and wild geese being often found in enormous quantities. The fur-bearing animals are wildcats, foxes, eroters, weasels, polecats, martens, badgers, hares and rabbits, the lynx, bear, eagle, and beaver are occasionally met with.

Manufactures.—The principal manufactures are linens, for which certain districts in Prussia, especially Saxony, and Brandenburg enjoy a European celebrity; while of late years the cotton manufactures, worked by steam, have maintained a successful rivalry with the older linens, worked by hand-looms. Besides these there are numerous manufactories of silk, wool, mixed cotton and linen fabrics; including fine shawls and carpets in Brandenburg, stockings and ribbons in the Rhenish provinces, where, as well as in Westphalia and Hesse-Nassau, the flax, hemp, and silk and cotton thread is mainly prepared for the manufacturers. These districts, moreover, stand foremost in regard to the preparation and manufacture of iron, steel (the steel and gun works of Krupp, at Essen, being world-famous), and other metallic wares, paper, leather, soap, oil, cigars, and tobacco, and for the number of their glass works. Saxony and Silesia have the largest number of chiocory, starch, beet-root, gunpowder, and glass works. Berlin and Elberfeld rank as the two most important centres of manufacture on the Continent. In 1893-94 there were 316 beet-root sugar factories in Prussia, which produced 1,901,000 tons of raw sugar. In 1894 the total value of the minerals produced in the kingdom was 576,679,725 marks (of which nearly two-thirds came from the Rhine-land and Westphalia); while the mineral produce of the German empire was only 675,000,000 marks.

Commerce.—The commerce of Prussia is materially facilitated by her central European position, and the network of river and canal navigation, which makes her commerce with the interior in several of the great European states, and which, with (1895) 17,486 miles of railway, 40,500 miles of public roads (all, or nearly all, formed since the time of Frederick the Great), and a coast-line of 1000 miles, gives her a free outlet to the rest of the world. The Prussian merchant fleet consists of nearly 2,255 vessels of 354,213 tons. The chief ports are Memel, Pillau, Königsberg, Danzig, Colberg, Swinemünde, Stettin, Wolgast, Stralsund, Kiel, Flensburg, Altona, Harburg, Geestemünde, Leer, and Emden. The principal commercial towns are Berlin, Königsberg, Breslau, Bautzen, Elberfeld, Danzig, Posen, Stettin, Cologne, Magdeburg, Aix-la-Chapelle, and Frankfort-on-the-Main. Annual fairs are still held at Breslau, Magdeburg, and Frankfort-on-the-Oder.

The number, measure, and weights of Prussia are those in force throughout the German empire. In accordance with the law of 1872 the mark is the unit of reckoning, and has gradually displaced Thalers (q.v.) and silbergroschen. The Prussian or Berlin Bank, founded in 1765, with numerous branches in the provinces, is the most important of those banks which possess the right of issuing notes.

Religion, &c.—The dominant religion is Protestantism, and since 1817 the Lutheran and Reformed Churches have been united under the head of one bishop, the General Superintendent of the Prussian Church, who is connected with the external administration of church matters, is under the control of the minister of public instruction and ecclesiastical affairs, but every religious community manages its own internal concerns; the Protestant churches acting in conjunction with ecclesiaries or boards appointed by the government, one of which exists in each province, under the direction of the upper president, or provincial governor, and a clerical superintendent-general, who in Posen and Pomerania bears the title of bishop. The Prussian church is directed by the two archbishops of Posen and Gnesen, and Cologne, under whom stand the four bishoprics of Culm, Münster, Paderborn, and Treves. The four episcopal sees of Breslau, Ermland, Osnabrück, and Hildesheim are directly controlled by the ministry. The Roman Catholic Church is directed by the two archbishops of Cologne and Gnesen, under whom stand the four bishoprics of Culm, Münster, Paderborn, and Treves. The results of the census of 1885, as regards the numbers of the religious bodies, are as follows: the Protestants of Prussia numbered 18,244,405 (64·4 per cent. of the pop.); Roman Catholics, 9,621,763 (33·9 per cent.); Jews, 366,575 (1·29 per cent.). Roman Catholics are most numerous in Hohenzollern (93 per cent.), Rhenish Prussia (72 per cent.), and Posen, Silesia, Westphalia, and West Prussia. The higher Roman Catholic clergy are paid by the state, the parochial clergy chiefly by endowments. For the Kultur-kampf, see the article GERMANY, Vol. V. p. 183.

Education.—Education is compulsory in Prussia between the ages of 6 and 14; there is an Act for the fourteen, and its management and direction are under the control of the state. In no country are better or ampler means supplied for the diffusion of knowledge among all classes of the community. Prussia has ten universities, Königsberg, Berlin, Breslau, Halle, Göttingen, Münster, Bonn, Kiel, and Marburg, which in 1889-90 numbered above 1240 professors and teachers and 15,770 students. The educational system has already been described
under Germany, Vol. V. p. 176. In 1896 there were in Prussia 36,000 elementary schools, with 82,300 teachers and 5,290,820 pupils. The management of 300,000 voluntary national schools is in the hands of the local communities; but the state appoints the teachers, and in part pays their salaries, the remainder being supplied by the public. In addition to the libraries of the several universities there is the Royal Library at Berlin, with 500,000 volumes and about 15,000 MSS. Among the numerous scientific, artistic, and literary schools and societies of Prussia the following are some of the more distinguished: the Academy of Arts, founded in 1700; the Royal Museum of Arts; the Academy of Sciences; the Natural History, Geographical, and Polytechnic Societies of Berlin; the Antiquarian Society of Stettin; the Breslaw Natural History and Historical Societies; &c.

Justice.—Till lately the Code Napoléon was in force in the Rhenish provinces, and in Hither-Pomerania the common German law; but in other parts of the kingdom the Prussian code, compiled under Frederick the Great's direction, was followed. A new penal code was promulgated in 1850, by which all pre-existing seigniorial, municipal, or ecclesiastical rights of decreasing punishments were undermined or abrogated. A new constitution was brought about in 1862, and in 1869 a code of commercial law valid for the North German Confederation. Since the establishment of the empire, the law has preponderance of that peculiar to the various states in a large number of subjects. Universal criminal and commercial codes are now in force for the whole empire, and a universal civil code has been prepared. A common judicature bill for the empire was passed in 1879. Prussia has sixteen Oberlandesgerichte or provincial courts, one or more in each province. Connected with that sitting at Berlin is the Privy-council of Justice, which has jurisdiction over the royal family and the princely houses of Holstein-Lolland.

The supreme tribunal of the empire has been established, not at Berlin, but at Leipzig, in Saxony.

Army, Navy, &c.—In 1890 the strength of the Prussian army was 1,376,500 men, 65,200 police, and 1,005,099 officials. The official returns, numbered 453,000, of whom 53,000 were cavalry and 64,000 artillery. The army consists of the regular troops and the Landwehr (q.v.), and in time of war an extra force can be called up under the title of the landstorm. Every able-bodied male Prussian is liable to be called upon to bear arms between twenty and thirty-nine years of age (see Germany). Clergymen of the Roman Catholic and Evangelical churches and indispensable supporters of families are exempt. Great care is bestowed on the education and military training of officers and men; and, besides numerous admirable academies, there are several good schools of operative and veterinary surgery, &c., connected with the educational department of the army. The navy of the new German empire is the navy of Prussia. See Germany.

Constitution, &c.—Prussia was an absolute monarchy till the crisis of 1848, when the decided movement in favour of liberal views compelled the king to convocate a national assembly, and submit to the establishment of a constitutional form of government, which he was bound to accept. The national representative body consists of two bodies: (1) an upper chamber (Herrenhaus, or House of Lords), which is now composed of the princes of the royal family who are of age, the chiefs of the mediatised princely houses recognised by the Congress of Vienna, and the Senate; (2) a lower chamber (Abgeordnetenhaus, or Chamber of Deputies), composed of 422 members, 332 for the old kingdom and 80 for the provinces annexed in 1867. Every Prussian who has attained his twenty-fifth year, and who has a municipal vote, has also a parliamentary vote, but not a direct one. Out of every 250 Urienhiiler, or electors in the first instance, is chosen a Wahlmänn, or direct elector. This is the man who, strictly speaking, votes for a member of parliament. Representatives are elected for five years, and each receives twenty marks per diem, the refusal of which is illegal. In addition to this general house of assembly there are representative bodies for the provinces, communes, and circles, which debate and legislate in regard to local matters within their several departments. The executive council of state is composed of eleven ministers appointed by the king, and holding office without reference to the comparative strength of political parties. The president of the council has a salary of £27,000, and a private income of £4800 arising from the sale of rents, whilst the modified constitution of 1850 all exclusive privileges arising from titles or station are abrogated, and perfect equality in the eye of the law fully recognised; liberty of the subject guaranteed in regard to religious persuasion, the right to hold meetings unwarmed within closed doors, and become members of societies; immunity from domiciliary visits, and inviolability of letters, &c. The monarchy is hereditary in the male line. The sovereign and royal family must profess the evangelical confession of faith. The king, who is not responsible for the measures of his government, and whose decrees require the counter-signatures of his ministers, exercises the executive power, nominates and dismisses the ministry, summons and dissolves the chambers, orders the promulgation of the laws, is commander-in-chief of the forces, has the right of presenting bills to parliament, &c. He bears the titles of King of Prussia, Markgraf of Brandenburg, Sovereign-duke of Silesia, Prince of Orange, Grand-duke of Pomerania and the Lower Rhine, besides a host of lesser titles. The title 'German Emperor,' by which he is now best known, is conferred on him as the son-in-law of the eldest son of the crown bears the title of Crown-prince. The ordinary royal residences are the palaces at Berlin, Potsdam, and Charlottenburg. The royal domains were ceded to the state by Frederick-William III. in 1820, on condition of a rental of 2½ million thalers being paid first from them to the king and his family, which, however, has been increased in 1859, 1868, and 1880 by means of a Kronobitation (crown-allowance) to £770,550.

In the year 1898-99 the budget-estimate of the receipts was 2,187,527,384 marks ($520,631,547), just balanced by the expenditure. The total national debt bearing interest was 6,483,222,000 marks ($1,543,482,836), or about 148.50 per head of the population. The direct taxes are an income-tax, land-tax, tobacco and spirit excise, religious and mortality tax, and amount to about 8s. 6d. per head. The income-tax yields about 1s. 5d. per head of the population.

Population, Races.—About seven-eighths of the population of Prussia are Germans. Of the Slavonic tribes the Poles number upwards of 5,400,000, and the Buriats 600,000. In Brandenburg and Silesia there are about 85,000 Wends; in East Prussia, upwards of 150,000 Lithuanians; Western Prussia has rather
more than 10,000 Walloons, using the French language; intermixed in its generally German population Silesia has 55,000 Czechs or Bohemians; Sileswick-Holstein, 140,000 Danes—making in all about 3 millions who do not use the German language, or who employ it only as secondary to their mother tongues.

Ranks, Classes.—Three distinct hereditary classes are recognised in Prussia—viz., nobles, burghers, and peasants. To the first belong nearly 200,000 persons, including the higher officials of the state, although that number does not comprise the various magic to convert the Teutonic knights and others belonging to different states, but connected with Prussia by still existing, or former territorial possessions. The burgher class includes, in its higher branches, all public office-bearers, professional men, artists, and merchants; while the peasantry—to which belong all persons engaged in agricultural pursuits—are divided into classes, depending on the number of horses employed on the land, &c.

History.—The lands bounded by the Baltic, which now form part of Prussia, were early occupied by the heathen; a religion for them was brought by the Lithuanians. It is conjectured that they were visited by Phoenician navigators in the 4th century B.C.; but, beyond the fact of their having come into temporary conflict with the Goths and other Teutonic horde prior to the great exodus of the latter in their flight from their enemies, nothing is known of the people till the 10th century, when they first appear in history under the name of Borussi, or Prussians. In 997 Bishop Adalbert of Prague suffered martyrdom at their hands while endeavouring for the conversion to Christianity. Boleslaus I, Duke of Poland, succeeded, however, in 1018, in compelling them to submit to baptism and subjection. After many futile attempts on the part of the people to throw off the yoke of Christianity and foreign domination, they finally made a successful stand against Boleslas IV, of Poland in 1161, and for a time maintained a rude and savage kind of independence, which the disturbed condition of Poland prevented its rulers from breaking down. The fear of losing their freedom if they adopted Christianity made the Prussians obstinately resist every attempt to convert them to Christianity; it was not till the middle of the 13th century, when the knights of the Teutonic order began their 'famous' crusade against them (see TEUTONIC KNIGHTS), that the Christian faith was established among them. The introduction of the pagan Prussians on the territories of their Christian neighbours, and their advance into Pomerania, was the exciting causes of this important movement. The knights of the order, when appealed to by Conrad, Duke of Masovia, to aid in the subjection of the heathen, gladly promised their services on condition of being permitted to retain possession of the lands which they might conquer; and, having entered the Prussian territories in considerable numbers, they entrenched themselves in Vogelsang and Nossen in 1259, and at once entered upon the conquest of Prussia in the half a century, the belligerent brotherhood were engaged in war with the people—winning lands and souls by hard fighting—until at length in 1283 they found themselves undisputed masters of the country, which they had both civilised and Christianised after a fashion—that is to say, by exterminating the pagan population.

During this period of struggle the knights founded the cities of Thorn, Kulm, Marienwerder, Memel, and Königsberg, repeopled the country with German colonists, encouraged agriculture and trade, and established in it the foundations of a strong and prosperous state. The unhappy war between the knights and the Poles and Lithuanians, together with the moral degeneracy of the order, led, in the 14th and 15th centuries, to the decline of their supremacy. In 1454 the municipal and noble classes, with the co-operation of Poland, rose in open rebellion against the knights, who were finally compelled to seek peace at any cost, and obliged in 1466 to accept the terms offered to them by the Treaty of Thorn. But a new state which was founded, Prussia and Ermland were ceded by them unconditionally to Poland, and the remainder of their territories declared to be fiefs of that kingdom. In 1511 the knights elected as their grand-master the Markgraf Albert of Anspach and Bairleuth, a kinsman of the king of Poland, and a scion of the House of Hohenzollern family. Although his election did not immediately result, as the knights had hoped, in securing them allies powerful enough to aid them in emancipating themselves from Polish domination, it was fraught with important consequences to Germany at large, no less than to the order itself. In 1525 the grand-master was acknowledged Duke of Prussia, which was converted into a secular duchy (afterwards known as East Prussia), and renounced the Roman Catholic religion, likewise followed by many of the knights. The country made rapid advances under the rule of Albert, who improved the mode of administering the law, restored some order to the finances of the state, established schools, founded the university of Königsberg, and with the help of German printers translated into Polish, and several books of instruction to be printed in German, Polish, and Lithuanian. His son and successor, Albert Frederick, having become insane, a regency was appointed. Several of his kinsmen in turn enjoyed the dignity of regent, and finally in 1618 was crowned with the crown of Poland, in the person of his son, Sigismund, elector of Brandenburg, after having held the administration of affairs in his hands for some years, was, on the death of the duke in 1618, recognised as his successor, both by the people and by the king of Poland, from whom he received the investiture of the duchy of Prussia, which, since that period, has been governed by the Hohenzollern-Brandenburg House.

Here it will be necessary to retrace our steps in order briefly to consider the political and dynastic changes of the last hundred years. In 1344 the North Mark, afterwards called the Altmark, a district in the west of the Elbe and north-east of the Harz, was bestowed upon Albert the Bear of Luxemburg, who extended his dominion over the marshy region near Brandenburg and Berlin (the Mittelpark), and assumed the title of Markgraf of Brandenburg. During the next two or three centuries his immediate descendants advanced still further eastward, beyond the Oder into Farther Pomerania. On the extinction of this line, known as the Ascanian House, in 1539, a century of strife and disorder followed, until finally Frederick V., count of Hohenzollern, and markgraf of Nuremberg, became possessed, partly by purchase and partly by investiture from the Emperor Sigismund, of the Brandenburg lands, which, in his favour, were constituted into an electorate. This prince, known as the Elector Frederick I., received his investiture in 1417. He united under his rule, in addition to his hereditary Franconian lands of Anspach and Bairleuth, a territory of more than 11,000 sq. m. His reign was disturbed by the insurrection of the nobles and the constant incursions of his Prussian and Polish neighbours, but by his firmness and resolution he restored order at home and enlarged his boundaries. Under Frederick's successors the Brandenburg territory was augmented by the additions of various acquisitions, although the system of granting appanages to the younger members of the reigning
houses, common at that time, deprived the electorate of its original rank. The *Dispatio Achilles*, however, which came into operation on the death of the Elector Albert Achilles (1470–86), while it separated Anspach and Brandenburg, legally established the principle of primogeniture in both. The most considerable addition to the electorate was the one to which references has already been made, and which fell to the Elector John Sigismund through his marriage in 1609 with Anne, daughter and heiress of Albert Frederick the Insane, Duke of Prussia. In consequence of this alliance the duchy of Cleves, the countships of Mark and Limburg, and the extreme province of Pomerania, now known as East Prussia, became incorporated with the Brandenburg territories, which were thus more than doubled in area.

The reign of John Sigismund's successor, George-William (1619–40), was distracted by the miseries of the Thirty Years' War, and the country was alternately the prey of Swedish and imperial armies; and on the accession of George-William's son, Frederick-William (q.v.), the 'Great Elector,' in 1640, the electorate was sunk in the lowest depths of social misery and financial embarrassment. But so wise, prudent, and vigorous was the government of this prince that at his death in 1688 he left a well-filled exchequer, and a fairly-equipped army of 38,000 men; while the electorate, which now possessed a population of one and a half million and an area of 42,000 sq. m., had been raised by his genius to the rank of a great European power. His successors Frederick I. (q.v.; 1688–1713) and Frederick-William I. (1713–40) each in his own way increased the power and credit of Prussia, which had been in 1701 raised to the rank of a first kingdom. The Elector Frederick William I. was distinguished for his rigid economy of the public revenue and an extraordinary penchant for tall soldiers, and left to his son Frederick II. (q.v.), Frederick the Great, a compact and prosperous state, a well-disciplined army, and a sum of nearly nine million thalers in his treasury. Frederick II. (1740–86) dexterously availed himself of the extraordinary advantages of his position to raise Prussia to the rank of one of the great political powers of Europe. In the intervals between his great wars he devoted all his energies to the improvement of the state, increasing the revenue, commerce, and encouraging the military, financial, and judicial departments of the state. By his liberal views in regard to religion, science, and government he inaugurated a system whose results reacted on the whole of Europe; and in Germany more especially he gave a new stimulus to thought, and roused the dormant patriotism of the people. Frederick was not over-scrupulous in his means of enlarging his dominions, as he proved by sharing in the first partition of Poland in 1772, when he obtained as his portion nearly all West Prussia. He also took part in the other distributions of 1772 and 1795. His nephew and successor, Frederick-William II. (1786–97), aggravated his kingdom by the second and third partitions of Poland in 1793 and 1795. Frederick-William III. (q.v.; 1797–1840), who had been educated under the direction of his grand-uncle Frederick the Great, succeeded in 1797, at a time of extreme difficulty, when continental rulers had no choice beyond being the opponents, the tools, or the victims of French republican ambition. By endeavouring to maintain a neutral attitude Prussia lost her political importance, and fell into the hands of her overt enemies. But the calamities which this line of policy brought upon Prussia roused Frederick-William from his apathy, and, with energy, perseverance, and self-denial worthy of all praise, he devoted himself, with his great minister Stein, seconded by Count Hardenbergh, to the reconstruction of the state. In the years 1806-10 Prussia underwent a complete domestic reorganisation; and after the battle of Waterloo, which restored to Prussia much of the territory lost at the peace of Tilsit in 1807, the career of progress was continued. Trade received a new impulse through the conclusion of commercial treaties made with the maritime nations of the world, the formation of excellent roads, the establishment of steam and sailing packets on the great rivers, and at a later period through the organisation of the Zollverein (q.v.), and through the foundation of the Reichskammergericht, and the fruitful provision was made for the diffusion of education over every part of the kingdom, and to every class. In like manner, the establishment Protestant Church was enriched by the newly-inaugurated system of government subvention, churches were built, the emoluments of the clergy were raised, and their dwellings improved; but, not content with that, the king forcibly united the Lutheran and Reformed Churches in 1817, a high-handed act most fruitful in discontent and difficulties. This tendency to over-legislation has long been the predominating feature of William the Fourth's reign. He preferred the state, without regard to the incongruous elements of which it was composed, was divided and subdivided into governmental departments, which, in their turn, under some head or other, brought every individual act under governmental supervision, to the utter annihilation of political independence. The people soon perceived that this administrative machinery made no provision for political and civil liberty, and demanded of the king the fulfilment of the promise he had given in 1815 of establishing a representative constitution for the whole kingdom. The summoning of the Diet of Frederick William, illusory as the king, and its immediate fruits were strenuous efforts on his part to check the spirit of liberalism. Siding with the pietists of Germany, he introduced a sort of Jesuitical despotism, which was continued by his successor, Frederick-William IV. The Landstände or provincial estates, organised in accordance with the system of the middle ages, were the sole and inadequate mode of representation granted to Prussia in this reign, notwithstanding the pledge made to the nation for a full and general representative government. The accession of Frederick William, II. was attended with a better prospect to the friends of constitutional freedom. A political amnesty was proclaimed, religious toleration was announced, and a contest betwixt the crown and the pope, in which the first signs of the coming Kulturkampf may be traced, was brought to a close by concessions on the part of the king. Frederick-William, however, was an enthusiastic upholder of the divine right of kings, and it soon became apparent that he was in no way prepared to follow up his vague promises of political liberty by sharing political power with the people. The country became daily more and more irksome to the nation, and it was evident that a constitutional struggle was inevitable. The king and his advisers, underrating the importance of the movement of 1848 in Germany, thought they had satisfied the requirements of the time by the measures taken by his father, and by reforms and by making equivocal promises of future concessions. A collision betwixt the troops and the citizens of Berlin, in which blood was shed, awoke the king to the full gravity of the crisis, and he hastened to ally the general discontent by the nomination of a civic guard, and the summoning of a representative chamber to discuss the proposed constitution. The conversion of the monarch to liberalism was but temporary; and although, after
much obstruction, a constitution, superseding the old Prussian estates by a representative parlia-
ment, was promulgated in January 1850, it was repeatedly modified in the following years, until
a few of its democratic features were left. Frederik-
William had early distinguished himself and de-
ligned many, both within and without of Prussia, by his patriotic utterances in favour of a
new united Germany. He was deeply chagrined
when in 1848 the national assembly at Frankfort, in-
flienced by Austrian jealousy of the military strength of Prussia, declined to accept him as the
imperial head. Instead of the Archduke
John of Austria as lieutenant-general of Germany.
Yet, when in the following year he was offered the
imperial crown, he found himself unable to face
the responsibility of accepting it. He hesitated to
make so important a move in the contest with
Austria for the hegemony of Germany. The later
years of this reign were characterised by great
advances in the material prosperity and internal
improvement of the country. Extensive lines of
railway and post-roads were opened, the river
navigated, and trade relations with foreign coun-
tries formed, and a great expansion given to the Prussian and North German Zollverein
(q.v.), the army put upon a footing of hitherto
unprecedented efficiency of arms and artillery, and
the educational system of the country still further
developed. Frederick, son of the first German emperor in 1871, had been regent of
the kingdom since 1858, owing to the insanity of his
brother, the late king. William was no more a
lover of constitutional, or at least of popular,
liberty than any of his predecessors; and in his
opposition to the principles of the popular move-
ment, in so far as it aimed at interference with the
regal power, he was powerfully aided by his great
adviser Bismarck (q.v.), who became prime-minister
in 1862 and imperial chancellor in 1871. The
successful wars with Austria (1866 and France
(1870–71), which so enhanced the prestige of Prussia
and which resulted in the united Germany of to-
day, are described at GERMANY. Since the king
of Prussia became German Emperor the history of Prussia has been practically merged in the
history of Germany. After his death, his son
Frederick III. (March 9 to June 15, 1888), his son,
William II. (q.v.), ascended the throne. While still
adhering to the military policy of his grandfather, and still cherishing a more or less exalted belief
in the divine right of kings, the young monarch has
shown himself able to realise the importance of the
great social questions of modern times, and ready
to deal with them in a decided yet sympathetic
manner. The advanced, and in some respects
socialistic 'labor-policy' of the emperor, unfavored
at a labour-conference of representatives of the
great powers in Berlin 1890, and the abolition of
the anti-socialist laws led to the resignation by
Prince Bismarck of all his ministerial functions in
March 1890, as well in the kingdom as in the
empire; and no subsequent Prussian minister has
since exercised important powers. Various
minor reforms, including a new scheme of local
government and of communal taxation, occupied the
attention of the Prussian diet. A bill of 1891,
giving compensation for the suspension of salaries
of Roman Catholic clergy in Prussia during the
Kilburnkampf was the formal beginning of this
compensation bill and some anti-
socialist legislation provoked controversy. The
history of Prussia is now in the main but part of
the history of the Empire of Germany (q.v.).

See besides works cited at GERMANY, BERLIN, FREDE-
RIK II., BISMARCK, &c., H. Tuttle, History of Prussia
(Boston, 1894–98); Godfrey de Casamiquel, Les Origines
de la Prusse Contemporaine (1899).

PRUSSIAN BLUE, the name given to sesqui-
ferrocyanide of iron, used as a colouring matter.
It was discovered in 1784 by Diesbach in Berlin
(whence it is also called Berlin Blue), and the
manufacture was kept a secret till 1724. See
BLUE; also DYEING, Vol. IV. p. 156.

PRUSSIC ACID, a name given to Hydrocyanic
Acid (q.v.), because it was first obtained from
Prussian blue.

Prutenic Tables, astronomical tables com-
piled in the 16th century, and so called because
based on the system of Copernicus, a Prussian.
They were corrected by Brade.

Pruth, a left-hand affluent of the Danube,
rises in the south-east of Austrian Galicia, on the
north-east side of the Carpathian mountains, and
flows eastward past Kolomea and Czernowitz ;
from the point at which it leaves Austrian territory
to its embouchure in the Danube at Reni, 13 miles
below Galatz, it forms the boundary between Russian Bessarabia and Romania. Length about
350 miles, nearby, 168 miles.

Prynne, William, born in 1600 at Swainswick
near Bath, from Bath grammar-school passed in
1616 to Oriel College, Oxford, and took his B.A.
in 1621. He entered Lincoln's Inn, and in due time
called to the bar, but was early drawn into the
vortex of ecclesiastical controversy, and during
the revolts 1627–30 published many tracts on
Health, Sickness (against drinking of healths),
and three other Puritan and anti-Arminian diatribes.
In 1633 appeared his Historia-Mastix: the Players
Sorgeyre, in whose index, on page 1164, occur the
words 'Women players notorious,' 'Some women players;' 'Six weeks after its publication Gabrietta Maria herself took part in a pastoral, so here was a reflection on
the queen's own virtue; and on 17th February 1634
Prynne was sentenced by the Star-chamber to a
fine of £5000, degradation from the bar, expulsion
from Oxford and Lincoln's Inn, the loss of both
ears in the pillory, and the shock to his vanity as
an author of seeing his book burned in public by the
hangman. He was, moreover, condemned to per-
petual imprisonment, and immured in the Tower
accordingly. Three years later the pertinacious
offender found some comfort in the publication of two more pamphlets, in which he fiercely assailed
the hierarchy, and was unsparing in his personal
abuse of Laud. For this he was once more pros-
ecuted; a fresh fine of £5000 was imposed on him;
he was a second time pilloried, losing such stumps
of ears as the hangman before had spared; and
he was branded on both cheeks with S. L. ('seditionis libellus'—rather 'stigmata Laudis' by Prynne's
interpretation). He was removed successively to
Lancaster, Carnarvon, and Mont Orgueil in Jersey,
and remained a close prisoner till in 1640—the Long
Parliament then sitting—he was released by a
warrant of the House of Commons, and a tumultu-
ous expression of popular sympathy celebrated his
restoration to liberty. He acted as Laud's bitter
prosecutor, leaving no stone unturned against his
old enemy (1644); and in 1647 became recorder of Bath, in 1648 member for Newport in Cornwall.
But opposing the Independents and Charles I.'s
execution, he was one of those of whom Cromwell
'pursued' the House of Commons, and was even
imprisoned (1659–62) in Dunster, Taunton, and
Pendennis Castle, Cornwall. Cromwell, not wishing
him to return to his place in parliament, bestirring himself in the royalist interest; and after the Restoration
Charles II. proposed to 'keep busy Mr Prynne quiet
by letting him write against the Catholics, and
pore over the records of the Church,' which
records account of Prynne was appointed keeper.
This did keep him fairly quiet until his death,
which took place at Lincoln's Inn on 24th October
1669. 'Voluminous Pryneum' Wood calls him; and the continuous stream of writings on the peripatetic topies of the day, which was always kept going, is the record of but a fraction of his literary activity. He was a great compiler of constitutional history, his most valuable works in this field being the Calendar of Parliamentary Write and his Records, both of which contain much that is useful and important.

See II. of Howell's State Trials; Documents relating to Pryneum, edited by S. R. Gardiner (Camden Society, 1877); and other works cited at CHARLES I. and LAUD.

Prytanenum, the town-hall of a Greek city, where the fire was kept perpetually burning, where ambassadors were received, where citizens who had deserved especially well of the state were sometimes allowed to live at the public expense; it was in fact the headquarters of the executive of the state. In Athens this body, the prytaneis, fifty in number, were chosen from the 500 members of the great council, five for each of the ten tribes. The five representatives of each tribe held office in rotation, one month at a time.

Przemysl, a town of Austrian Galicia, on an affluent of the Vistula, 61 miles W. of Leubourg by rail. It is the seat of a Roman Catholic and a United Greek bishop, carries on a considerable trade, and has manufactures of machinery, spirits, wooden wares, &c. Since 1874 it has been strongly fortified. Pop. (1890) 33,209, fully one-third Jews.

Psalmazar, George, 'the Formosa,' was born probably in Languedoc, between 1679 and 1685. Educated by monks and Jesuits at Avignon and elsewhere, he at sixteen turned vagabond, and for two or three years wandered through France, Germany, and the Low Countries, by turns an 'Irish pilgrim,' a 'Japanese convert,' a waiter, a 'hathood soldier,' and a soldier. At last, in 1710, he found in a ready accomplice in one Innes, chaplain to a Scottish regiment, who baptised him 'George Lander' after the governor, brought him over to London, and introduced him to Bishop Compton. For that cedulous prelate he translated the Church Catechism into the 'Formoso' language; and to him he dedicated his Historical and Geographical Description of Formosa (1704), which found many believers in spite of its patent absurdities, such as that Formosa belonged, not to China, but to Japan, and that the hearts of 18,000 boys were sacrificed every day by the Jesuits to the idols.

Psalmazar left England for watercolour dances to Oxford, and for a while he was lionised by the highest in the land. In spite, however, of his eating raw meat and enormous quantities of pepper and opium (an opium-eater he continued to the last), people gradually lost faith in him, or the novelty wore off, or by Law's Serious Call (1729) he was converted to a sense of the error of his ways. Anyhow, we find him the alleged importer of a white 'Formoso' enamel, a tutor, a regimental clerk (1710-17), a fan-painter, and lastly, for years a diligent hack-writer for the leading London newspapers, largely of his compiling; and his, too, one of the popular Essay on Miracles. But in all his strange life there is nothing stranger than the esteem expressed for him by Samuel Johnson. He was the man he 'sought after most,' 'the best man he ever knew,' and 'the best among the host of contrariating a bishop,' and whose 'piety, penitence, and virtue exceeded almost what we read of as wonderful in the lives of the saints.' An old man of fourscore years, he died in London on 3d May 1703.

See the autobiographical Memoirs of * * *, commonly known by the name of George Psalmazar (1764), and articles in Temple Bar (1865) and the Cornhill (1870).

Psalmody. See HYMN, SACRED MUSIC.

Psalms. The title indicates a collection of songs set to music (for use in the temple), and then sung in the churches. According to Flom, 'hymns;' this corresponds exactly to the Hebrew Chalilim, 'praises,' or 'songs of praise.' The etymological element is in fact the most essential in the name; but the solitary exception of Ps. lixxviii. there is an undercurrent of thanksgiving even in the most melancholy compositions (cf. Eph. v. 19, 20).

There was, however, an earlier stage of psalmody, as a linguistic study of the Hebrew title assures us, when the service of religious songs was of a character not under the control of guilds of singers. The ancient Arabs used a term (tahlih) which corresponds to 'chalih for the shouting of a short consecrated formula, and the common root of both names means 'to call, cry out.' Only by degree did the Israelitish 'psalmody' rise from a shouting like that of the vintage or the bridal night to the carefully trained singing of later times. Indeed, as late as the fall of Jerusalem the noise of the Babylonian soldiers in the temple is compared to that of the worshippers on one of the olden feast-days (Lam. iv. 13). The question therefore arises, Can our present psalms, so spiritual in tone and in form comparatively so artistic, really be the very forms of prayer and praise used by the pre-exilic Israelites? Or have they literally driven out earlier and less spiritual compositions? Or lastly, have the older formulae been greatly expanded and idealised, or even sometimes permitted to become imbedded in later works? For this last conjecture some analogies might perhaps be found in the prophetic literature (see, e.g., Isa. ii. 2-4, and Ewald, The Prophets, i. 83), but it can only be admitted to a heuristic proof of the existence in a psalm of really strong inconsistencies of thought and language. Till that proof is given let us accept each psalm as the monument of some particular age, without attempting to extenuate by analysis fragments of earlier origin than the rest of the poem. To ascertain approximately that age or those ages is the function of criticism. True; but have the critics the means of doing this? 'When once it is admitted, as it must be admitted, that the titles cannot be absolutely relied on,' says an English commentator, 'we are launched upon the sea of uncreative speculation. The critic gets no help.' The question of the origin of the Psalter is of course a complicated one, but we must not say that the student of complicated problems is like a mariner without a compass. There are three conditions upon compliance with which the disagreement of critics will be reduced within very narrow limits. The first is, that no critic should approach the Psalter until he has assimilated a good number of the best critical results which have been reached in other parts of the Old Testament. The second, that he should begin at the end of the Psalter—i.e. with Ps. cxlv.—and proceed backwards. The third, that he should break radically with the custom of looking at each psalm by itself, with a view to determining its period. The result is likely to be not only similarities in language and in tone between the Psalms and other old Hebrew writings; many at least of which afford valid evidence of the date of the poems, the psalmists being in a high degree initiatory, and infinitely more prone, for instance, to borrow from, or imitate, the prophets than to borrow from them. The reason of the second is that, the Psalter being a combination of five 'books' of psalms, it is natural to presume that the two last
PSALMS

469

(whi(ch properly form but one book) are later as collections from the three first. These five books are, (1) Ps. i.-xli., (2) Ps. xii.-lxxii., (3) Ps. lxxiii.-lxxxix., (4) Ps. xc.-cv., (5) Ps. civ.-cl. And that of the third is that within these live characteristic psalters, which have certain common characteristics, and may, at any rate at the outset of the inquiry, be presumed to contain works of the same (not too strictly defined) period. These minor psalters are the Davidic (to which the 'Davidic' psalms in Hallel, iv. and xlix., belong), the pre-exilic, the post-exilic, the pre-Exilic, the Asaphite, and the Songs of Ascent (i.e. of pilgrimage), commonly miscalled 'Songs of Degrees,' in addition to which there are various other groups of psalms, not marked by traditional headings, such as the Hallel and the Hallelujah psalms, the denter-Israelite (i.e. those which suggest the writer's acquaintance with the exile portions of Isaiah), and the Jeremianic (i.e. those which from internal evidence were written either by Jeremiah or by a follower of that great prophet).

Thus, the conscious or unconscious object of receiving Psalms has been the imparting a stricter and more scientific character to the argument from internal evidence. Not the least difficult part of the work is that which relates to the linguistic phenomena, the evidential value of which is variable, depending on the identification. This kind of evidence is no doubt rarely conclusive, but even in the case of the highly imitative psalm-literature will lead the critical student to some perhaps unforeseen results, unless indeed his way is barred by the arbitrary assumption that all the evidence of internal probability, which is not based upon these pre-exilic psalms have been introduced by editors. And what upon the whole are the results of a criticism which does not float 'upon a sea of uncertainty'? Two very definite ones may be mentioned, with a warning, however, to the student that the criticism of these portions was interwoven with that of other Old Testament books that many good Hebraists might hesitate to endorse even these moderately-stated results. First, that there is a considerable number of psalms belonging to the pre-Maccabean and Maccabean Greek portion of the post-exilic period (see especially Ps. lxxv.-cxv., cxvi.-cxvii., cxviii.). The possibility of this theory (which was virtually held by Theodore of Mopsuestia) is expressly admitted in the margin of our own 'Geneva Bible.' The objections to it are not entirely withstanding the critical study of them, however, are conclusive. It has been urged, for instance, that the so-called Psalms of Solomon (the composition of which falls between 63 B.C. and 46 B.C.) breathe an entirely different spirit from the psalms which may most plausibly be referred to the period of the Greek rule and of the Maccabean rising. But it can be easily shown that the latter event was a turning-point in Jewish religion, after which we might fairly expect a considerable difference in the tone even of liturgical poetry. Moreover, the phrase 'an entirely different spirit' is an exaggeration. There are certainly the germ of legalism in Psalms i., xix., 7-14, cxiv., and those of later doctrines of immortality and resurrection may (if the late dates of Ps. xv., xvii., cxvii., cxviii., be granted) be not unreasonable found in parts of the Psalms. It is not necessary to maintain that the Psalms of Solomon contain passages strikingly parallel to our Ps. xlvi. A second result is that none of the extant psalms are the genuine work of David, who was doubtless a gifted musician and poet (the early tradition on this point is clear), but whose hymns were probably too little in accordance with later ideas of art and of religion to escape the great literary as well as political catastrophe of the Exile. Contrast the life of David in the Books of Samuel with the character sketched, evidently from life, in the so-called Davidic psalms. Granting that David lived in the service of an ideal which he sought, but often failed, to realise, could that ideal have agreed with the picture presented to us in the Psalter? How much is there in the tone or the ideas of the implied circumstances of the psalms which agrees with the tone or ideas of the traditional speeches of David and with his traditional history? Enough perhaps to permit us to regard him as a for-advertisement of the nobler members of the 'community,' and the man of the post-exilic age, who was the 'root and offspring of David' (Rev. xxii. 16), but scarcely more than this. Indeed the only doubt is, not so much whether any psalms are Davidic, but whether any are even pre-exilic at all. The fact (which, even without scientific proof, it would be unreasonable to doubt) that David composed some psalms was enough to make collectors call certain psalms, or collections of psalms, by his name, somewhat as the various expansions of the older law in different ages were usually referred to Moses. David was in fact the most likely of the post-exilic psalmists to have been a poet, and the Psalms, written or composed in his name, were really the first to be written in that name.

Yet the arguments for this view are seldom, if ever, cogent, and mainly depend for their acceptance on our ideas of historical probability, which is never a certain ground of these pre-exilic psalms have been introduced by editors. And what upon the whole are the results of a criticism which does not float 'upon a sea of uncertainty'? Two very definite ones may be mentioned, with a warning, however, to the student that the criticism of these portions was interwoven with that of other Old Testament books that many good Hebraists might hesitate to endorse even these moderately-stated results. First, that there is a considerable number of psalms belonging to the pre-Maccabean and Maccabean Greek portion of the post-exilic period (see especially Ps. lxxv.-cxv., cxvi.-cxvii., cxviii.). The possibility of this theory (which was virtually held by Theodore of Mopsuestia) is expressly admitted in the margin of our own 'Geneva Bible.' The objections to it are not entirely withstanding the critical study of them, however, are conclusive. It has been urged, for instance, that the so-called Psalms of Solomon (the composition of which falls between 63 B.C. and 46 B.C.) breathe an entirely different spirit from the psalms which may most plausibly be referred to the period of the Greek rule and of the Maccabean rising. But it can be easily shown that the latter event was a turning-point in Jewish religion, after which we might fairly expect a considerable difference in the tone even of liturgical poetry. Moreover, the phrase 'an entirely different spirit' is an exaggeration. There are certainly the germ of legalism in Psalms i., xix., 7-14, cxiv., and those of later doctrines of immortality and resurrection may (if the late dates of Ps. xv., xvii., cxvii., cxviii., be granted) be not unreasonable found in parts of the Psalms. It is not necessary to maintain that the Psalms of Solomon contain passages strikingly parallel to our Ps. xlvi. A second result is that none of the extant psalms are the genuine work of David, who was doubtless a gifted musician and poet (the early tradition on this point is clear), but whose hymns were probably too little in accordance with later ideas of art and of religion to escape the great literary as well as political catastrophe of the Exile. Contrast the life of David in the Books of Samuel
prophetic religion, and that the priests in particular were unprogressive. How then should there have been, if so like the other books, that spiritual regeneration of which the 'Second Isaiah' was presumably the chief instrument? The only way to avoid the conclusion that the Psalms are (with the possible exception of Ps. xviii., and some will add, of Ps. xx., xxi., xlv., lix., lxxii.) post-israelitic is to suppose that those books represent especially those which remind us of Jeremiah, were written in the reign of Josiah and during the Exile, with the prophetic hope that they would one day be required by a reorganised church-nation. This position represents perhaps the only lifted ecclesiastical optimism of the future, but cannot here be discussed.

In any case, the ideal character depicted in the Psalms belongs to an advanced period in Israel's history. It is that of a righteous man who, in the face of oppression, clings to his religion and his God, who trusts to be delivered, and for the most part is delivered, and who now and then forms bold anticipations of a world converted to the true God, or, it may be, is crushed into reluctant obedience; and in the noblest features of this ideal it is impossible not to trace the influence of the great religious poet of the later period—Jeremiah and the 'Second Isaiah.' It is such a righteous man who, at least in Books i.—iii., for the most part appears to be the speaker, and the question arises, whether he is more accurately viewed as a personification of Israel, or as simply the typical or representative Israelite, such as every member of the congregation either was or desired to become. In some cases no one can deny that the former theory is alone correct (see, e.g., Ps. iv., lx., lxxvii., cxvii., cxxxix.), and there are not a few other psalms where its absolute rejection would involve the interpreter in the greatest psychological difficulties (see, e.g., Ps. vi., xxii., xxx., li., lxx., cxxx.).

It has indeed been hastily stigmatised as forced and fanciful, but the number of passages elsewhere in the Old Testament which without it are unintelligible (see, besides the sections in Second Isaiah relative to the servant of Jehovah, Num. vii. 23—26; Micah, vii. 1—7; Hosea, iv. 4, 5, vii. 8, 9; Lam. i. 3), and the numerous analogies in the Greek choruses, prove the baselessness of the charge. The solidarity of the individual and his tribe was in the mind of the poet, and the relation of the individual to the ancient peoples. It is, however, a priori improbable that the new sense of the duties and privileges of the individual, which was stimulated (but hardly caused) by the preaching of Jeremiah and Ezekiel, should not have left its mark on the Psalter of the second temple. And do we not find such a mark on some or even many of the Psalms? Does not the personality of the psalmist sometimes at least assert itself with distinctness (see, e.g., Ps. xiv. 1, lxvii. 2, 3, 13—17, 21—28, evi. 4, 5, cxxxix. 18)? Yes; but it will also be noticed that even in such passages and where no mark of distinction is to be observed (perhaps the only exceptions) the psalmist speaks, not only in his own behalf, but at any rate for a class within the church-nation. And in some of the psalms in which a reference to the nation may most plausibly be maintained, it is almost everywhere impossible to hold that the typical or representative Israelite (in the sense described above), or even that the psalmist himself in the same psalm sometimes has the nation, sometimes himself, or any other pious Israelite, in view as the speaker. Reading the Psalms from this point of view we see that spiritual regeneration of which we see that it is the troubles of the Church-nation, and not those of any individual, however highly placed, which are described, we can account for the strength of the language, and are also stirred up to purge the personal criticism of its selfishness. It only needs to be added that every part of the church-nation must be a truly historical one.

We must not rest contented with the perception that there is a strong family likeness in the Psalms. We must seek out not only resemblances but differences to ascertain, so far as we can, the historical background of each group of psalms. Hitzig and Ewald may have gone too far in this historical 'divination,' but without exercising this faculty to some extent it is impossible fully to enjoy the Psalms. Historical data will not be wanting if we search for them, and the comparative method will here too be found applicable. The period from the Return to the Maccabees was not so monotonous as it is represented in our handbooks, and by judiciously distributing the Psalms over it on grounds of internal evidence we gain as many fresh first-class authorities for the history of the Jewish Church.


Psalter. See Dulciuer.

Psalms. See Psalms.

Psalms. See Psalms.

Psalmmite. See Psalmmicthias.

Psalms. See Psalms.

Psalms. See Psalms.

Psalms. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.

Pseudonym. See Psalms.
periods in history when the acknowledgment of the authorship of certain pamphlets or books might mean death or banishment to the writer. It is commonly found throughout the ages that, on public men, or those consisting of theological controversy, the attacks would appear under assumed names. In recent times young authors especially have frequently risked a new work under a pseudonym, and have kept it up afterwards. Once an author is famous it is found advisable to stick to a pen-name. For instance, every one knew the writings of 'George Eliot,' but few would at once have recognised a work by Mary Ann Evans. The present list is not intended to be exhaustive: names in occasional use are not given, but only those which have been impressed by many of the public. Neither have those well-known literary disguises as those adopted by the author of Waverley been repeated here. It may just be noted that for a longer or shorter number of years 'the author of Waverley,' 'the author of John Halifax, Gentleman' (Mrs Craik), 'the author of Guy Livingstone' (G. A. Lawrence), 'the author of Oliver Twist' (W. Robertson), 'the author of Chronicles of the Schönberg-Cotta Family' (Mrs Charles), 'the author of Supernatural Religion' (unknown), 'the author of Ecce Homo,' 'The Autocrit of the Breakfast Table,' &c. have been practically used as pen-names.

For further information, see the article ANONYMOUS; Weller, Larriem Pseudonymorum (1886); Cushing, Initials and Pseudonyms (1881), and Anonymous: A Dictionary of Revealed Authorship (2 vols. 1890); Clegg's Dictionary of Second-hand Booksellers, &c. (3d ed. 1891); and Halkett and Laing's Dictionary of Anonymous and Pseudonymous Literature (1881.)

Opium Eater, T. De Quincey.
Ozic, Oliver, Wm. T. Adams.
O'Ball, Paul Blouet.
Ouida, Louise de la Ramée.
Peo. H. A., Alex. H. Japp.
Parley, Peter, G. Mogridge.
Parke, W. Tegg; J. Bennett, J. F. A. Parkinson, E. S. F.
Pindar, Peter, John Wooton.
Plympton, Peter, Sydney Smith.
Pratt, T. B., Mrs. Mary Brown.
Q., John and George Wiliams.
Quinlin, Dr. Dillingham.
Red Spinner, Wm. Senior.
Rex, Mrs. Arthur Humphreys.
Rob Roy, John Maggrep.
Rowing Englishman, E. C. Grenville.
S.D.G.O., Rev. Lord Sydney.
San, George, Godolphin Osborne.
Sax, Kauffmann, E. Baxter (see Barnes).
Sethers, Martinus, Swift, Pope, and Arbuthnot.
Sealsfield, Charles, K. A. Pocell.
Selkirk, J. H., James B. Brown.
Shirley, John Skelton.
Sketchley, Arthur, Rev. George Rose.
Sick, Adam, G. H. Leibmann.
Spy, Leslie Ward.
Stribling, B. S., M. W. Sterne.
Suckley, Mrs. Henry Ward.
Swift, John.
Stonehouse, J. H. Walsh.
Stretton, Heba, Sarah Smith.
Stowe, Harriet Beecher, Mrs. Emerson.
Syrinx, Dr., Wm. Combe.
Taup, T. A. L. von Jacob.
Taylor, G., Professor Hannah.
Thomson, Thomas, J. G. Holland.
Timothy, Michael.
Angelo, W. M. Thackery.
Tennyson, Samuel Clemens.
Tyler, Sarah, Miss H. Keddle.
Uncle Remus, Joel Chandler Harris.
Urbain, Sybil, K. P. Godfrey, Gentlemen's Magazine.
Vancea Villor, Thomas Hughes.
Voltaire, François Marie Arouet.
Ward, Artemus, Chas. F. Brown.
Warren, Florence, Mrs. G. James.
Wellesley, Elizabeth, Mrs. George H. Winter.
Winters, John Strange, Mrs. H. E. Van Dam.
Zadig, Chas. J. R. Morris, R.N.
PSORALEA lead It large monasteries. A brief cathedrals, the youth, persons is (1891) 1,029,053. Venus) the beautiful population. But she now often the feeling, science neural distribution (1885) of these men. the body. The feeling, constitutional. is covered by a small, whitish scale. may be covered with a whitish scale. The feeling, constitutional. The disease may occur at any age, but usually first manifests itself in youth, rarely before the age of six. It is extremely apt to recur: it is rare for a person to suffer from it only once. The causes assigned for the disease; it has been attributed to scrofula, gout, and many other constitutional states; and doubtless it may be associated with them. But, with the exception of heredity, no cause has been satisfactorily shown to lead to its development. It frequently occurs in persons otherwise in perfect health, and, except in very severe cases, does not interfere in any way with their employments. If left to itself, the disease generally tends to persist indefinitely. But in the great majority of cases it is very amenable to treatment, both local and constitutional. Locally, ointments, tar, resorcin, pyrogallic acid, &c. are most in use; internally, arsenic is far the most valuable remedy. Where it has failed, iodide of potassium in large doses, liquor potassae, and carbolic acid have sometimes succeeded. But some cases resist the most varied and persevering efforts for their cure; and nothing has yet been discovered which will prevent the tendency to recurrence of the disease.

Psyche (Gr., 'the soul'), an exquisite creation of the later mythology of Greece. She was the youngest of the three daughters of a king, and so beautiful that mortals mistook her for Aphrodite (Venus) herself, and did all kinds of favors for her. This excited the jealousy of the goddess, who sent Eros (Cupid) to inspire Psyche with a passion for the most contemptible of all men; but Eros was himself wounded as deeply by her glances as ever he had wounded others with his darts. He accordingly caused her to be carried to a beautiful palace of pleasure, and here every night he visited her, unseen and unknown, and left her before morning broke. Thus Psyche might have enjoyed perpetual delight had she remembered the advice of her unknown lover, who warned her not to seek to know who he was. But her passions led her to tear down the strongholds of her own defense; she had allowed to visit her, played upon her curiosity, and persuaded her that she was embracing a monster in the darkness of night. Lighting a lamp when Eros was asleep, she saw with rapture that she was the mistress of the most handsome of the gods, but in her excitement she let a drop of hot oil fall on the sleeper's shoulder. This awoke Eros, who upbraided her for her mistrust, and vanished. Psyche gave way to the most passionate grief; she tried in vain to throw herself into a river, then wandered about from temple to temple, inquiring for Eros and the way to that palace. But, as she entered, she met the goddess, where she was seized by the goddess, and kept as a slave. Eros, however, who still loved her, invisibly helped and comforted the hapless maiden, reconciled her to his mother, and was finally united to her in immortal wedlock. In works of art Psyche is represented as a beautiful maiden with the wings of a butterfly. Her story was considered as an allegory of the progress of the human soul through earthly passion and unhappiness to that of pure celestial felicity; but it must not be forgotten that it is merely a version of one of the more advanced folk-tales. See Cupid, and Zingows's Psyche and Eros (1881).

Psychic Forces. See THEOSOPHY; and for the Psychical Research Society, see APPARITIONS.

Psychology may be briefly defined as the science of mental phenomena. After having long occupied a doubtful place as a department of metaphysics, supplemented by many empirical observations, its character as a science dealing with a special order of facts, and many of the laws of occurrence of these facts, may now be said to be established. At the same time opinion is still far from unanimous on many of the most important points of psychological doctrine, especially on such points as involve a philosophical view of the nature of mind. The chief different ways of conceiving and defining the mental facts with which psychology has to do may be traced to the influence of rival philosophical hypotheses as to the nature of mind. Thus, in the first place, we have the view that psychology deals with the facts of the conscious mind which, when knowing, feeling, or striving, is always conscious of itself as knowing, feeling, or striving—i.e. is self-conscious. This is the view, for instance, of Sir W. Hamilton. But it has many difficulties. We can hardly ascribe self-consciousness to the lower animals or to very young children, insane persons, whom again life closely belongs to them; so that it would seem that mental life and self-consciousness cannot be identified. Further, many psychologists (including Hamilton) are of opinion that there are mental phenomena unaccompanied by self-consciousness even in mature human life. And if self-consciousness is thus recognised as belonging to mental life only under certain conditions and at a comparatively developed stage, it will be one of the main purposes of psychology to examine these conditions and trace its growth. In the second place, a materialistic view of mind puts it altogether, in one way or another, brain-physiology play the part of a psychology. It is plain, however, that a sensation or a feeling of pleasure or pain is a fact of an entirely different order from a neural disturbance. The one may accompany or even cause the other (or both may
be only different aspects of the same ultimate existence), but the characteristic nature of the mental fact is not reached by the most thorough investigation of its physiological conditions, while the phenomena they are adduced to explain. In the third place, an attempt has been made (sometimes apart from any philosophical hypothesis as to the nature of mind) to start with certain mental facts—called presentations, sensations, or feelings—of which the ultimate can often be traced, and to extend the laws and manner of their combination and succession. This method has been worked with excellent result by the English Associationist psychologists. By a similar method, and by treating presentations as forces, Herbart and his followers have elaborated a mechanical view of the mind and reduced psychology to mathematical form. The difficulty of this mode of conceiving mind is to explain how a series of sensations—or any interaction of presentations—can generate the consciousness of a self persisting through changing states; and even to give any meaning to sensation or presentation without regarding it as experienced by or presented to mind. On these grounds many psychologists, while influenced by the scientific method of the Associationists and of Herbart, hold that the interpretation of experience is as belonging to a subject or mind. So far, mind must be assumed by the psychologist as implied in the experience of which he has to trace the development. This subject, or mind as the condition of experience, may be admitted to elude psychological observation. As a whole says a psychologist, one can catch myself at any time without a perception, and never observe anything but the perception ̣ — i.e. it is the empirical ego, or mind with its content of experience, which is the object of psychological observation, and not the pure ego, or subject, which is nevertheless implied by every mental fact. Psychology may, in this way, be distinguished from other sciences as dealing with subjective facts, or, rather, with the subjective aspect which belongs to all facts—i.e., as Dr. J. Ward puts it, the phenomena connected with presentation to a subject.

Method of Psychology.—If this view of the subject-matter of psychology be adopted, it is clear that the ultimate source of our knowledge of mental facts must be the knowledge each person has of his own mental states. The mental attitude of attending to these states is called Introspection. The nature and value of introspection have been much disputed. But the arguments of Comte and others to show that the process is impossible, and psychology only another name for a department of physiology, prove too much: for were introspection impossible we should not even know that there are such things as mental states. It may be admitted, however, that the introspective attitude involves an effort of will, and mental states are not always willing to be observed. Consequently many obscure elements of mental life may elude its cognizance, and only become known through their effects upon the flow of ideas; while, on the other hand, states of intense mental concentration exclude it, and can only be observed by the weakened form of memory-images. It is even held by many writers that this is the sole method of introspective observation: that all introspection is retrosection. In this way the results of introspection are apt to lack accuracy, and (as it is sometimes written) their also lack objective or universal validity. To supply these wants the introspective or subjective method has been supplemented by objective observation both of the physiological antecedents and concomitants of mental facts, and of the expressions, products, and records of conscious life. The latter are to be found in the emotional expressions and actions of normal men; in the emotional expressions and actions of children; in the innate or race type, the insane, and the lower animals; in language, art, and all institutions. To this side of psychological study, which involves the application of the comparative method to psychology, contributions of the greatest value have been made in the Zeitschrift für Volkerpsychologie, or comparative psychology, by G. F. Müller, L. C. H. Steinthal, and others.

Further, within recent years attempts have been made to apply experimental methods to psychology. Experiments on reaction-time, for instance—i.e. on the time taken to react upon stimuli—lead to the determination of the time taken up by mental operations of different kinds and different degrees of complexity. Similar experimental methods have been adopted for investigating the accuracy of reproduction, the number of things that can be attended to at a time, &c. Laboratories, such as that at Leipzig, of which Wundt is the head, exist both in Germany and in America for the prosecution of these experimental investigations. The results of many experiments have already been recorded; but it would be premature at present to estimate the value of these results for psychology. Amongst the experimenters who keep the history of their investigations always in view, mention should be made of Miinsterberg (Beiträge zur experimentellen Psychologie, 1889 and following years).

Psychophysics.—The experimental inquiries above referred to may to a large extent be traced to certain investigations (chiefly) of E. H. Weber's on minima sensitiva and on the relation between the intensity of the sense-stimulus (which can be measured objectively) and the intensity of the consequent sensation (which cannot be directly measured). His experiments were further carried out and their results formulated and elaborated into the science of psychophysics by G. T. Fechner (Elemente der Psychophysik, 1860; reprinted 1889).

By psychophysics Fechner means the exact science of the relations between body and mind, this science being based upon facts and numerical relations they involve. The generalisation arrived at from experiment is by Fechner called Weber's Law, and expressed by him in the following (amongst other) terms: There will be the same relative increase in the intensities of sensations, provided the relative intensities of the stimuli producing them remains the same. Thus, an increase of 1 to a stimulus whose strength is expressed by 100 will be experienced as of the same intensity as an increase of 2 to a stimulus whose strength is 200, or of 3 to a stimulus whose strength is 300, &c. The literature of psychophysics is occupied with the experimental verification, the mathematical development, and the interpretation of this law. But neither its experimental nor its interpretative application is quite satisfactory. Experiment supports it in a certain range of sensibility. It is limited first of all by what Fechner calls the fact of the threshold—i.e. the fact that a certain amount of stimulus is required to produce any sensible effect whatever; and secondly, at the other end of the scale, when the stimulus is beyond a certain intensity, the relation ceases to hold good, while within these two limits its verification cannot be said to be exact. Further, it is only in the sense of pressure and the muscular sense that we can accurately measure the intensity of the stimulus in the form in which it reaches the nervous end-organs; in hearing and sight the objective stimuli undergo physical or chemical changes in the sense-organ before reaching the extremities of the nerve-
fibres. Again, all the experimental methods for establishing the law assume the equality of least sensible differences. Thus, if there be stimuli measured respectively by 100, 101, 200, 202, causing sensations $x$, $x'$, $y$, $y'$, such that $x'$ is only just distinguishable from $x$ but only just distinguishable from $y'$, it is assumed that $y' - y$, an assumption which neglects the important fact that there is no mental content corresponding either to $(x' - x)$ or to $(y' - y)$. Finally, even if the law can be held to be established, it is not clear that it requires to be interpreted (by Helmholtz) as properly psycho-physical. It may also be held that the law is really physiological, the intensity of the stimulus being modified in this way by irradiation in the nerve-centres; while Wundt has attempted a psychological interpretation of it, maintaining that it holds of the relation between mere sensation and the 'apperception' of the sensation by the direction of attention to it.

Mental 'Faculties'.—The observation and description of mental facts have led to a classification of them, according to their degrees of likeness, in certain respects. These laws lead to a series of different powers or functions of the mind. In the earliest stage of psychological inquiry we even have them described as different parts of the soul. In this way Plato distinguishes desire, anger, and reason, and locates them in the lower part of the body, in the heart, and in the brain respectively. But the classification which had most influence upon subsequent writers was Aristotle's. His distinction of thought and desire is the origin of the dual classification of intellectual and active powers (each with many subdivisions) which was for long put into each branch of psychology. A tripartite classification—Cognition, Feeling, and Desire or Will—was put forward by the psychologists of Kant's time, accepted by Kant, and since his time (in Great Britain since Hamilton's time) has been very generally adopted. The value of such classifications is easily, and has often been, overestimated. In the first place, it is clear that, although such functions or faculties may be distinguished, they do not operate apart from one another. No concrete state of mind consists merely of knowledge or merely of will; nor can it be properly described by the names, except as means of describing it by its most prominent characteristic. In the second place, it has to be borne in mind that it is no explanation of a mental fact to refer it to a mental faculty. To maintain, as Kant, Hamilton, and Lotze did, that there are certain fundamental conscious functions or conscious elements which cannot be reduced to some single function or element, gives no real support to the view which seems to underlie much of the 'faculty-psychology'—the view that mind is a congeries of distinct faculties, and psychology a process of their separate analysis, except as a means of describing it by its most prominent characteristic. In the second place, it has to be borne in mind that it is no explanation of a mental fact to refer it to a mental faculty. To maintain, as Kant, Hamilton, and Lotze did, that there are certain fundamental conscious functions or conscious elements which cannot be reduced to some single function or element, gives no real support to the view which seems to underlie much of the 'faculty-psychology'—the view that mind is a congeries of distinct faculties, and psychology a process of their separate analysis. To refer phenomena to memory, generalisation, &c. as their causes is to mistake a name for an explanation. The 'Faculty-psychology' described and demolished by the English Associationists and by Herbart is, however, rather a mode of thought into which certain writers have frequently lapsed than a method which they have consciously adopted and defended. And the quest for a simple and uniform mental element from which all that wealth of conscious life has been derived is not therefore successful, because the faculty psychology is only a confused conglomeration of the interaction of presentations as accounting for all mental phenomena; in a similar way W. Spencer seeks to derive mind from a succession of somethings which can only be described as analogous to nervous shocks. But the difficulty of both is to pass from this objective element to the feeling of pleasure or pain, aptly described by Hamilton as subjectively subjective, or to the phenomena of Volition. Accordingly, many psychologists who are at one with Herbart and the Associationists in rejecting the conception of faculties as a mode of explanation, and in whose final analysis we can reach of consciousness of or of mental phenomena does not enable us to derive subjective feeling (of pleasure or pain) from presentation, or activity from either, the three elements being involved in the simplest state of consciousness (the term 'consciousness' as distinguished from 'self-consciousness', being here used as a quite general term for any mental state).

Attention.—Many of the most important controversies of psychology centre in the question of the nature and extent of the activity involved in consciousness. In its simplest form this activity is seen in the subjective reaction involved in apprehending a presentation; in its most developed form it is the act of will which determines a course of conduct upon which momentous issues are known to hang. In the latter case, as well as in the former, attention is a factor of primary importance. Attention. Now attention is generally allowed to be a special 'faculty,' or separate activity different from the elements of consciousness already described. It is simply consciousness regarded as active and as concentrated on some portion of its object. Hence the subjective consciousness of intensity of that portion is increased. The problem is chiefly whether this active concentration is ultimately determined by the strength of external factors. It is clear that the direction of attention is conditioned by the previous mental groupings of ideas; the 'concentration of attention' is focal, localized, and even claretegical; one of the muscular adjustment—of any kind directed to objects of sense, and also (although in a less marked degree) when directed to a train of thought. These facts are differently interpreted. On the one hand, Bain, Ribot, and others find the basis of attention in the muscular adjustment; on the other hand, the muscular adjustment is looked upon as the organic expression and development of subjective activity; and this subjective activity is held to be involved in the simplest state of consciousness. The one view looks upon the external environment as determining both attention and the internal. According to the other view the process is one in which a subjective or spiritual factor expresses itself through and gradually extends its control over an organic and physical environment.

Sensation.—Sensations are commonly defined as the simple mental states which result from nervous stimuli. This physiological reference enables us to distinguish the Special Senses, with their clearly defined organs adapted to the reception of different kinds of external stimuli, from Organic or General Sensibility, which arises from the state of the internal organs of the body (such as the alimentary canal, the lungs, and the heart), and from the Motor Sensations. These last (which play so important a part in the development of knowledge) are due to the central excitation of a motor or efferent nerve, and the consequent contraction of the muscles in which it terminates (the Nervous System). The sensation both modifies and is modified by the conscious state into which it enters. We have no experience, and can form no valid conception, of the mere sensation. For the subject which experiences it, it is in their entirety. In Helmholtz it is the whole thing which is experienced. This is a point which has been commonly overlooked by the Associationist psychologists. They started with a succession of disconnected mental molecules, called sensations, and attempted to trace the growth of mental life from their combination. But this is to begin with an abstraction.
The earliest stage of mental life would rather seem to be a vague manifold into which distinction is just being brought; and the growth of knowledge consists not only in the addition of new elements, but in drawing new lines of distinction and forming new groupings of elements. And these distinctions and groupings may involve, first, the modification by the varying intensities of different elements in the changing mental content, or by the continuous redistribution of attention.

Ideaion.—The mental content thus varies in the distinctness of its parts, which may even disappear from consciousness and afterwards reappear. This reinstatement in consciousness is called Representation or Ideation, and the represented or ideal contents are called Images. The circumstances determining the succession of ideas and formation of images are, first, new sense-impressions; secondly, voluntary or directed attention; and thirdly, the mutual influence of the mental elements. It is the last of these which is referred to under the title of Laws of Association. In the article Association of Ideas an account is given of the circumstances in which experience recalls another. In every case of association a twofold process would seem to be involved. A portion of the present mental content coalesces with a resembling portion of a past mental state, and the revival of this portion involves the re-inscription of the mental elements by which it was previously connected. The latter, which is the properly reproductive process, is thus due to the fact that consciousness is not a collection of atomic sensations, but a continuous whole.

Perception is the knowledge by means of sensation of an individual object or thing. The nucleus of the percept is thus one or more present sensations which coalesce with revived or ideal elements belonging to the same sense, and combine with revived or ideal elements belonging to other senses. These sensations and representations may be bound together and presented as a single mental content, which we refer to a portion of the body or to a thing in space beyond the body, and to which we ascribe qualities corresponding to our sensations and representations. The percept is thus determined by the combination of our sensations or representations, and in the case of a given percept, involves, first, complexity of elements; secondly, localisation; and thirdly, individualisation and objectification. The complexity consists of the elements of present sensation, and of the ideal group with which the former coalesces or combines. The localisation clearly involves the perception of space. The individualisation and objectification may be accounted for by the following considerations: (a) The various sensations grouped together in a percept—e.g. the resistance, touch, colour, taste, smell of an orange—are so related that modification of one of them commonly involves modification of the others. Thus they come to be perceived as a group. (b) Not only are motor sensations involved in fixing attention on other sensations, but the greatest distinctness of the other sensations is commonly accompanied by conditions which admit also of sensations of touch and resistance. Hence the object comes to be experienced as offering resistance or as an obstacle. (c) In this way the other sensations come to suggest touch and resistance, and thus to be referred to a thing in space. This constitutes the mental character of the percept. This process involves giving space a certain distinctness apart from the former theory. But it is important to remember that certain sensations—odors, tastes, and even sounds—are localised only indirectly, as belonging to a visible or tangible object. And this fact at once suggests the lines upon which an empirical analysis of space should be carried out.

Thus we start with two opposed views of the perception of space: first, the Intuitive or Nativist theory, according to which space is an innate idea (or, as since Kant it has more commonly been put, the form in which we perceive objects), and is not derived, as it is held by the empiricists, from receiving, belonging a priori to the mind, and contributed by it in the production of experience; secondly, the Empirical theory, according to which space is the worked-up product of sensations. The universal and necessary character of the spatial perception has been brought forward in defence of the former theory. But it is important to remember that certain sensations—odors, tastes, and even sounds—are localised only indirectly, as belonging to a visible or tangible object. And this fact at once suggests the lines upon which an empirical analysis of space should be carried out. By Herbart space has been derived from a series of sensations which can be repeated in the same and in reverse order. By Bain it has been held that it is due to muscular sensation—movement giving the perception of empty space; resistance giving that of space filled or body. Sensations both of movement and resistance accompany touch; and sensations of movement accompany sight to an extent which is not nearly equalled in the other senses. In addition to this, however, we must take account of tactile or immediate touch, the 'local signs' which belong to tactile and visual sensations. These local signs are due to the extended nature of the sense-organs of sight and touch, and are elements in sensation by which sensations arising from the sense-organs of other sensibilities to the victim (or of the skin) are distinguished from one another. The simultaneous distinctness in sensation which is due to these 'local signs' is gradually
interpreted by motor sensations, and out of these elements there gradually emerges the perception of one's own body, by relation to which other things are localised in space. Thus, although the perception of space is implied in that of body, the two perceptions grow to clearness together. Even within this empirical analysis, however, it may still be held—as Lotze held—that there is an a priori mental tendency to form the perception of space.

The opposed views of Nativism and Empiricism are applied to the perception of time as well as to that of space. And the perception of time only seems a simpler question than that of space because we are apt to confound the succession of presentations on which it is based with a presentation of succession, which, of course, would be a presentation of time. The elements from which this presentation of time is derived may be somewhat as follows: When a number of presentations are successively presented, each grows fainter as attention passes from it, and hence arises a vague distinction between present and not-present. Afterwards, on the same series being repeated, the second member will raise in intensity when the first is presented, and therefore will fully participate in the experience of the present when the second is presented, the first will be sinking in intensity, while attention will be passing on towards the third, whose intensity will therefore be rising; and so on throughout the series. Hence the vague distinction of present and not-present becomes more definite as a distinction of past, present, and future, and this is the presentation of time.

Memory and Expectation.—Both of these are distinguished from the mere succession of ideas and images by involving a reference to one's own conscious life as a suitable topic. When an image is remembered its various parts have a fixed order and position, it is accompanied by a number of attendant or accessory ideas, and it is recognised as belonging to one's past self. The expected image has not always the same fixed position or number of attendant ideas; but it, too, is referred to self—one's future self, and it is characterised by an element of striving or tension and by an increasing degree of intensity. The phenomena of memory and expectation are a recognised difficulty for the theory which seeks to derive mind from the succession of presentations.

Thought.—In the process of thinking different mental contents are related together—generalised into notions or concepts, discriminated, and, in the higher forms of thought, arranged in an orderly manner under some scientific or other ideal. Thinking is further distinguished from perception and imagination by dealing with classes of things rather than particular objects, and by being mainly voluntary, whereas perception is mainly automatic. But the distinction is not an absolute one. In imagination, and even in perception a process of voluntary selection may be involved in perception; and a clear perception involves a conception of a class to which the object is referred. Further, the relating process which is characteristic of thinking may be found, though in a less explicit manner, involved in perception: for a concept has been shown to consist of a variety of simple ideas connected together in definite ways. Carrying the analysis further, we can find no conscious content without such relations. This has been commonly brought out by emphasising the necessity of difference for concept formation. Holberg has asserted that "to have always the same sensation and to have no sensation at all come to the same thing; and this has been formulated by Bain into the Law of Relativity, that all consciousness is consciousness of difference: not, indeed (as Bain some-

times puts it), that we are conscious only of difference, but that all consciousness involves difference or discrimination; as it may also be shown to involve likeness or assimilation and synthesis.

Relations are thus involved in all consciousness equally with elements related. 'Feelings' and 'relations between feelings' (to use Mr Spencer's terminology) must be regarded as practically ultimate units of mind in mind. The English Associationists made consciousness begin with separate units of sensation or 'feeling'; and those writers who have received and carry on the tradition of the Associationists have devoted much attention to determining the nature of the connexion between the various atoms of datum of consciousness is not separate atoms of presentation, but what Dr Ward calls a presentation-continuum, and if the growth of mind consists not merely in additions to that continuum, but in drawing new lines of distinction and connection within it, we may see how neither the so-called 'feeling' nor the so-called 'relation between feelings' is independent and conceivable by itself, and how both are simply abstractions from the state of mind which—even at its simplest—is a concrete phenomenon. In other words, what is characteristic of consciousness is that the characteristic of sensation is involved in all consciousness.

Feeling and the Emotions.—The term Feeling is of very ambiguous significance in psychology. But there is a pretty general agreement to use it for the second of the three elements in the tripartite division of mind (although, unfortunately, it has not been restricted to that use). The psychology of feeling has two chief problems to deal with: first, to determine the nature and conditions of pleasure and pain, as contrasted with other elements of mental life; and secondly, to analyse into their elementary units. The complex nervous sensations of other elements of consciousness and of motion—e.g., tension, will, etc.—are admitted to be composite. Feeling is connected, more or less distinctly, with a presented or ideal object, and is complicated with elements of organic sensation, and, usually, with tendencies to action or elements of desire. These complex states of feeling, or emotions, take very various forms, according to the elements of which they are composed, and their mode of origin. The classification of the emotions and the nature and origin of such complex elements as sympathy, sentiment are still vexed questions of psychology.

Desire and Volition.—In these phenomena we have the development of the active element in mind complicated with feeling and manifesting itself in muscular activity. Writers who regard this active element as ultimately due to the play of merely presented or external factors have attempted to derive volition from spontaneous movement (Bain) or from reflex action (H. Spencer)—factors which enter consciousness merely as motor presentations. As opposed to this we have the view that feeling and desire (WILK) and the direction of attention to certain ideal elements or groups. Whether this direction of attention is itself determined solely by pleasure and pain is a question which has raised more controversy than perhaps any other question in psychology (see WILL). In Desire things are connected toward the external or ideal end, accompanied by feeling and by an element of striving. Normally, when the conception of the end has been associated with definite means to its realisation, the desire is followed by a volition or act of will. The development of volition is a matter of growth, and of volition, consciousness. Beginning with the act of attention, the power of will is gradually extended over the bodily movements controlled by muscles in connection with the motor nerves. Movements which are at
first random, reflex, instinctive, or merely expres- 
sional, are brought within its operation. Further, 
will grows side by side with reason and imagination, 
is not bounded not by reason or imagination 
only, but in response to images and concepts, and 
can thus be regulated by reason. A double tend-
cy is at work in this development: the associative 
and automatic tendency of acts frequently repeated 
to become habitual; and the intellectual tendency 
by which ends and the aims tending towards them 
are brought into rational order. In this way the 
individual comes to act for permanent ends and 
from fixed principles, and to develop a definite 
character.

LITERATURE.—The first scientific treatise on psychology was 
Aristotle's work De Anima. In modern philosophy 
the intuitional and spiritualist theory of psychology is to 
be found in Descartes and Leibnitz, an empirical and 
materialistic theory in Hobbes. The Association-psycho-
logy, which traces descent from the psychological philo-
sophies of Locke and Hume, and from the physiological 
psychology of Hartley (Observations on Man, 1749), may 
be read now in the works of James Mill (Analysis of the 
Phenomena of the Human Mind, 2d ed. 1809), J. S. Mill 
(Examination of Hamilton's Philosophy, 5th ed. 1878), 
and A. Bain The Senses and the Intellect, 3d ed. 1868; The 
Emotions and the Will, 3d ed. 1860; Mental 
and Moral Science, 3d ed. 1877. Belonging to the 
same school, but conditioned throughout by the doctrine 
of evolution, is H. Spencer's Principles of Psychology 
(2d ed. 1870-72). To the Herbartian influence is due the 
exhaustive work of W. Voitke and V. Spitzler (Lehrbuch der Psychologie, 3d ed. 1884). Independent views, 
which are yet influenced by Herbert, are worked out by 
Lotze (Mediçinische Psychologie, 1862; book ill. 
Metaphysics, Eng. trans. 1884; Microcosmica, Eng. 
trans. 1883; Outlines of Psychology, Eng. trans. 1886) 
and by J. Ward (article Psychology in Encyc. Brit., 9th ed.). Experimental psychology is represented by the 
work, among others, of Wundt, Ebbinghaus, Münster-
berg, Kibot, Pierre Janet, and by many contributions 
from German, French, Italian, English, and American journals. 
A useful summary of results is given by G. T. Ladd 
Elements of Physiological Psychology (1887). Founded 
largely upon these is the brilliant work of W. James, 
Principles of Psychology (1890). Important text-books 
are Sully's Outlines of Psychology (1884) and The Human 
Mind (1882). Baldwin's Handbook of Psychology: Senses 
and Intellcit (2d ed. 1890) and his Elements (1883), 
Dewey's Psychology (1889). J. C. Murray's Handbook of 
Psychology (1885). Hoffding's Outlines of Psychology (Eng.
trans. 1881), and Maheu's Psychology (R. Catheline, 1889). 
Wundt's Lectures on Animal and Human Psychology 
were translated in 1894: C. Lloyd Morgan has published 
An Introduction to Comparative Psychology (1894) and 
Psychology for Teachers (1883); and G. T. Ladd 
Primer of Psychology (1894). See also PHILOSOPHY, 
and other articles cited there.

Psychrometer, an instrument for measuring the 
tension of aqueous vapour in the atmosphere: 
a wet and dry bulb Hygrometer (q.v.).


Pterodactyl (Gr., "wing-finger"), a remarkable 
winged reptile, the remains of which are met 
always white, but have dark shafts to their quills. 
In summer the males are predominantly grayish 
brown above, with blackish head, shoulders, 
and breast, with white belly, with black tail-feathers 
tipped with white. In the females a tawny colour 

Common Ptarmigan (Lagopus mutus), summer and 
winter plumage.

Pterichthys, See BOGHAZ-KEUL.

Pterichthys (Gr., "wing-fish"), a genus of 
eptic Ganoid fishes, remains of which occur in 
Devonian strata. The head and body were covered 
with bony sculptured plates, and the pectoral fins 
to the wing-like appearance of which the name 
refers were large and prominent.

Pterolites, or Pterolcetes. See SAND-GROUSE.

Pterodactyl (Gr., "wing-finger"), a remarkable 
winged reptile, the remains of which are met
PTERODACTYL

with in the Jurassic and Cretaceous systems. There are numerous forms of Pterodactyl which are included in the extinct order Ornithosaurus. The head was relatively large and snout-like, the long jaws being furnished with simple and pointed teeth, implanted in separate sockets. The eye-orbit was very large, the sclerotic having generally a ring of bony plates, and the nostrils approximated to the orbits. The neck was long and bird-like, consisting of procumbent vertebrae which were longer than the dorsals—the latter varying from seventeen to twenty in number. From three to six vertebrae are anchylized to form the sacrum. The tail is generally short, but long-tailed forms are also met with. The scapular arch and keeled sternum in their general characters resemble those of the carinate birds. There are four digits on each limb—the outer digit of the manus (corresponding to the fifth of the typical series) being immensely elongated for the support of a membranous expansion (patagium), which was also attached to the sides of the body to embrace the hind limbs and tail. The other digits of fore and hind limbs terminated in curved claws. Most of the bones are hollow like those of birds. The body was probably naked.

Many forms of Pterodactyl are known, in some of which the skull is less bird-like than that shown in the accompanying illustration. In Rhamphorhynus the extremities of the jaws are usually edentulous, and were perhaps sheathed in horn; the base of the jaws, however, was furnished with teeth which were inclined forwards. In the same form the tail was long, and provided at the extremity with a leaf-like steering membrane. In Dimorphodon the jaws are provided with strong teeth in front and much shorter ones behind; and the tail was long.

Some pterodactyls were small—Pteniodraco being not larger than a sparrow. Others were about the size of a woodcock. Yet others, however, were much larger—some having a spread of wing of 5 or 6 feet, and even of 25 feet in the case of certain forms from the Cretaceous rocks of England. The form of its extremities shows that the Pterodactyl was capable of perching on trees, of hanging against perpendicular surfaces, and of standing firmly on the ground, when, with its wings folded, it might crawl on all fours, or hop about like a bird.

Ornithosaurus are well represented in the Mesozoic strata of Europe and North America. One of the richest repositories of their remains is the famous lithographic stone of Solenhofen, in which the fossils usually occur in a fine state of preservation—even the impression of the membranous wing being sometimes clearly seen. See Nicholson and Lydekker's Palaeontology.

Pteromys. See FLYING ANIMALS.

Pteropoda (Gr., 'wing-footed'), a class or sub-class of molluscs, having two lobes of the 'foot' developed into wing-like swimming organs. They live in the open sea, and are carnivorous. Distributed in all seas, they often occur in limnicous swamps, and afford food to fishes and Cetacea. The body is bilaterally symmetrical, but this is doubtless secondarily acquired. In some (Thecosomata) the viscera are covered with a delicate shell; the others (Gymnosomata) are naked, but all the former have larval shells. The latter, grizzle-like shells are abundant in the Ooze (q.v.) of some regions. It is very likely that the Pteropods should be ranked not as a separate class of molluscs, but as a sub-class of Gasteropods. Of the Thecosomata the general investigators are C. Arai and C. Conmore, as Clio and Pseudomeron are of Gymnosomata. Fossil Pteropods appear even in the Cambrian strata. See Pelseneer, Challenger Report (1889). Some Pteropods are sometimes called 'sea-butterflies.'

Ptolemaic System. See PTOLEMY.

Ptolemais. See ACRE (ST JEAN D').

PTOLEMY, name of the Macedonian kings of Egypt. The first, a son of Lagos, was called Soter ('Saviour') by the Rhodians, whom he defended against Demetrius Poliorcetes. He became one of the greatest of the generals of Alexander the Great (q.v.), and on Alexander's death became ruler of Egypt.

For the other Ptolemies, his successors, see EGYPT, Vol. IV, p. 241; and for their patronage of literature, ALEXANDIAN SCHOOL.

PTOLEMY, properly CLAUDIUS PTOLEMAEUS, a celebrated astronomer and geographer, was a native of Egypt, though it is uncertain whether he was born at Pelusium or Ptolemais in the Thebaid. Nothing is known of his personal history, except that he died in Alexandria in 130 A.D., and there is probable evidence of his having been alive in 161. The chief of his writings are the Mégalya Êkòma ñy Òstronhia, which, to distinguish it from the next mentioned, seems to have been denominated by the Greeks and by the Arabs after them megistè, 'the greatest,' whence was derived the name Almagest (with Arab article al, 'the'), by which it is generally known; the Tetrabiblos Syntaxis, with which is combined another work called Karpous or Centipodapros, from its containing a hundred aphorisms—both works treating of astrological subjects, and held by some on this account to be of doubtful genuineness; a treatise on the phenomena of the fixed stars, or a species of almanac; and the Geography, his great geographical work, in eight books. The rest of his works are of inferior importance, and consist of descriptions of various kinds of Projections (q.v.), the theory of the musical scale, chronological and metaphysical treatises, and a summary of the hypotheses employed in his great work, the Almagest.

Ptolemy, both as an astronomer and geographer, held supreme sway over the minds of almost all the scientific men from his own time down till the 16th-17th century; but, and in astronomy specially, he seems to have been not so much an independent investigator as a corrector and improver of the work of his predecessors. In astronomy he depended almost entirely on the teachings of Hipparchus. But, as his works form the only remaining;
authority on ancient astronomy, the system they expound is called the Ptolemaic System, after the author.

As a geographer Ptolemy is the corrector and improver of the works of a predecessor, Marinus of Tyre, about whom, except from Ptolemy's works, we know nothing. Ptolemy's improvements and suggestions are at once both valuable and correct; but it is sometimes difficult to separate his data from those of Marinus. His geography is divided into eight books, all of which, with the exception of the first, eighth, and tenth, are usually treated as separate works. The rest is a catalogue of places, with their latitude and longitude (to 12th of a degree), with a brief general description prefixed to each continent and country or tribe, and interspersed here and there with remarks of a miscellaneous character on any point of interest. The rest of the work contains details regarding his mode of noting the positions of places—by latitude (mēkos) and longitude (platos)—with the calculation of the size of the sphere of the earth, and of the extent of surface then known. These were calculated from Eratosthenes and Hipparchus, and most of the world; but he counted it only 24 degrees W. of Cape St. Vincent, instead of the true distance, 9° 29'. He took the parallel of Rhodes for his chief line of latitude, thinking it would give the most central position in the earth, the climate into which he divided the earth. He describes the mode adopted by him of projecting the surface of a hemisphere on a flat surface, and shows its superiority over the projections of Eratosthenes, Hipparchus, and Marinus. He also constructed a series of maps of the earth, and his map of the real map of the world, in illustration of his work. See Map.

The Ptolemaic System of astronomy, so called from Ptolemy, its chief expounder, was really originated long before his time, and was, in fact, merely an attempt to reduce to a scientific form the conceptions and primitive notions concerning the motions of the heavenly bodies. It was implicitly adopted by Plato, Aristotle, Hipparchus, and (with the exception of the Pythagoreans, and probably of Pythagoras himself) all the eminent philosophers of ancient times; passing from them to the Byzantine astronomers, who, especially the latter, were the means of disseminating it through western Europe, where it continued to be the universally established doctrine till the 16th century. The primary and fundamental doctrine of Ptolemy was that the earth is the centre of the universe, and that the heavenly bodies revolve round it in circles, and at a uniform rate. These notions, which are naturally suggested by the first general aspect of things, having previous to any accurate observation, established themselves as unquestionable axioms, phaenomena which were found on closer examination to be inconsistent with them were explained by the introduction of additional hypotheses. The belief that the earth is the centre of the universe was supported by its accordance with the relation of the principal planets to the material world was supposed to be composed. Thus, earth, the most stable of the elements, held the lowest place, and supported water, the second in order; above water was placed air, and then fire, either being supposed to extend its influence by some others. In or beyond the other element were certain zones or heavens, each heaven containing an immense crystalline spherical shell, the smallest enclosing the earth and its superincumbent elements, and the larger spheres enclosing the smaller. This is the whole of the heaven, and the universe, body, which, by the revolution of the crystalline, was made to move round the earth. The first or innermost sphere was that of the moon, and after it in order came those of Mercury, Venus, the Sun, Mars, Jupiter, Saturn and the fixed stars, eight in all. To this system later astronomers added a ninth sphere, the motion of which should produce the Precession of the Equinoxes (q.v.), and a tenth to cause the alternation of day and night. This tenth sphere, however, was valueless to Ptolemy, who wished to revolve from east to west in twenty-four hours, and to carry the others along with it in its motion; but the Ptolemaic astronomers do not venture to explain how this was done, although, since the axis of the earth is inclined to the equator, its extremities being the poles of the heavens, while that of the ninth sphere was the axis of the ecliptic, some explanation was certainly necessary. As observations of the heavens increased in accuracy it was found that the heavenly motions were apparently not uniform, and this was explained as follows: The acceleration of the sun on one side, and retardation on the other side of his orbit is only apparent, and results from the earth not being in the centre of the sun's sphere, C (see fig.), but at E, and consequently at any point to be slowest at P and quickest at R. The alternate progression and regression of the planets was accounted for by supposing them to move, not directly with their crystalline, but in a small circle, whose centre was a point in the crystalline, and which revolved on its axis as it was carried round with the latter; thus (fig.) the planet was carried round the small circle ABD, as that circle was carried round HQR (now supposed to represent the planetary crystalline). The planet while in the outer portion of its small circle would thus have a forward, and in the inner portion a backward motion. The larger circle was called an eccentric, and the smaller an epicycle. This theory of epicycles and eccentrics satisfied the early astronomers; but further investigation showed its incompleteness, and in later times it was found necessary to explain newly-discovered discrepancies by heaping epicycle upon epicycle till a most complex entanglement resulted. As soon as astronomers came to understand and test the Copernican Theory (see COPERNICUS), this venerable and disorderly pile of hypotheses, which had received the papal seal of infallibility, and had in various forms held supreme sway over the minds of men for twenty centuries, at once crumbled to atoms and sunk into oblivion. See Astronomy.

The Almagest and the Geography were the standard text-books to succeeding ages, the first till the time of Copernicus, the second till the great maritime discoveries of the 16th century showed its deficiencies. They have passed through numerous editions, the best of which are, for the Almagest and the most of Ptolemy's minor works, that by Halma (Paris, 4 vols. 1815-28); and for the Geography, the Latin version of 1482 and 1660, published at Rome, the edition princeps of the Greek text by Ermusius (1533), the Elzevir edition (1619), those of Wilberg and Grasbig (1644), Nobbe (1845), Müller (Paris, 1883), and the photographic reproduction of the MS. in the monastery of Mount Athos by Langlos (Paris, 1860). The catalogue of stars has been frequently reprinted separately, the best edition being that of Francis Daily, in vol. xii. of the Memoirs of the Royal Astronomical Society (1529).

Ptolemaeus, it has been known for a very long time that food which has undergone putre-
faction may, under certain circumstances, act as a violent poison, setting up severe catarrh, and producing symptoms of a more general nature. Stale meat, fish, and vegetables have gained a popular reputation on account of their poisonous qualities. A ptomaine was first obtained by Marquardt in 1865, and described by him as similar to conine; in 1869 Sülzer and Sonnenschein isolated a crystallizable ptomaine which resembled in its qualities acetone. In recent years attention has been called to this question from another point of view, and one of special interest to the medical jurist. At a trial at Rome, on the occasion of a supposed murder, a material was extracted from the body which had markedly poisonous qualities similar to those of delphinine. It was supposed by those who undertook the prosecution that this poison had been administered to the deceased, but on the side of the defence it was pointed out that the extract, though similar in some respects to delphinine, was in others quite distinct, producing on the frog's heart very different effects.

Attention having been called to the subject, scientific investigators, especially those of Italy and Germany, busied themselves in extracting these poisonous materials, ptomaines (Gr. πτωμα, 'a corpse'), from putrescent animal matters, and investigating their chemical and physiological properties. These ptomaines can hardly be said to form a very distinct group of bodies from a chemical point of view, for some, like putrescine and cadaverine, are amines; others are amino-acids, like creatinin and neurine, which has choline and muscarine closely allied to it, is trimethyl-vinyl ammonium-hydroxide. It is even questionable whether they may be said to possess an alkaline reaction, at one time supposed to be a common property of all ptomaines, and one which related them to the vegetable alkaloids, for Salkowski has recently shown that creatinin, a body that has been long known and apparently carefully investigated, when obtained pure gives no reaction with litmus-paper, nor does it possess the power of combining with acids like a base. Bieger, too, has pointed out that it is scarcely possible to look upon putrescine and cadaverine as true acting agents, since many of them, especially those rich in oxygen, are deficient in this power.

Neither from a physiological point of view can we look upon the ptomaines as sui generis, and in the first case because many of them are produced by the reproductive organs, *during menstruation*. In the second, well-known examples let us instance creatinin and neurine, which are produced every day in our living bodies, showing that during the putrefactive process we cannot be said to find substances which stand alone, and are invariably different from those formed during digestion and assimilation. Finally, in respect to their poisonous properties, not only are some of them perfectly harmless or poisonous only in a minor degree, but it is highly probable that some of the most poisonous products of the action of putrefactive and other organisms are bodies (alumines) of quite a different chemical constitution. It is therefore probable that in a few years, when more positive information is at our command, the term ptomaine will either be dropped altogether or restricted in its usage. In the meantime scientific men are actively investigating the subject, and a number of involved problems of chemical physiology and preventive medicine.

See Selmi, *Sulla Ptomaine ed Alkoloidi Calvnerici* (Bologna, 1878); Fanum, 'Das patrige Gift, die Bac terien' (Virchow's Arch., Bd. 60, § 301); Nenczi, "Zur Geschichte der bisherigen Pflanzenprodukte" (Journ. f. praxis Chemie, Bd. 21); Brieger, "Über Ptomaine" (Berlin, 1885); also the article *PTOMIA*.

**Ptohis** (from Gr. ἱππό, 'a fall') signifies a dropping or falling of the upper eyelid, and arises from weakness of the muscle which elevates it, or from pressure of a third or motor oculi nerve. If it is congenital, or occurs as an accidental cause, and resists medical treatment, it may be removed by a surgical operation, by which the eyelid is brought under the action of the oculi-frontal muscle, which receives its nervous power from another source.

**Ptyalin, PTyalism.** See *SALIVA*.

**Puberty** is the period of life at which the reproductive organs in both sexes begin to function normally and is marked by a series of changes in the structure and functions of the body. Among the peoples of northern Europe it begins in girls at from twelve to fourteen, and in boys about two years later. In girls both growth and development are about this period more rapid than in boys; the breasts enlarge, and the figure becomes full; the temperature changes; and the menstrual flow begins to appear. In boys the most obvious changes are the breaking of the voice and the growth of hair on the face. The changes begin at this time are not fully completed for the physical and mental life of adult life is established for at least eight or ten years after the commencement of puberty. The health during this period is specially liable to be disturbed by adverse influences, particularly in the female sex; and overstrain, both of the physical and mental powers, should be carefully guarded against.

**Publicani** (from Lat. publicum, 'that which is public or belongs to the state'), the name given by the Romans to those persons who farmed the public revenues (*vectigalia*). These revenues were put up to auction by the censors, and were 'sold' for a period of five years. They were derived chiefly from tolls, tithes, harbours-duites, the tax paid for the use of public pasture-lands, mining and salt duties; and from the special taxes they collected, publicani were classified as decumiani, pecunarii or scriptarii, and condutores portariorum. As the state required them to give security for the annuity which they had prevailed the collection of the taxes, and as this sum was usually much greater than the wealth of any single individual, companies (*societates*) were formed, the members of which took each so many shares and were thus enabled to carry on conjointly undertakings far beyond the power of any single individual to undertake. Every society had also a head-delegate (*understater*), who resided at Rome, and transacted all foreign correspondence with the inferior officers who directly superintended the collection of the taxes. The publicani belonged to the order of *equites*, and formed from their immense profits a powerful capitalist class. Under the empire the land-tax and poll-tax came to be collected by officers of state—in senatorial provinces, the quasestor; in imperial provinces, an imperial procurator assistant to the governor; while in provinces like Judea, administered by an equestrian, the governor himself was himself at the same time procurator. The customs, on the other hand, even in the days of the empire, were still commonly leased out to publicani, and so undoubtedly in Judea. No doubt territorial princes like Herod Antipas also employed this method of collecting their tribute, much higher and more exacting than the publicani's. The lessees again had their subordinate officials, who would usually be chosen from the native population. But even the principal lessees in later times were not necessarily Romans. Zacechus, the tax-gatherer of Jericho (Luke, xix, 1, 2), was a Jew. The tariffs were often very indefinite, opening wide the door to arbitrariness and rapacity. Hence in New Testament phraseology the terms *publicani* and
PUEBLOS

Public Health Acts. See Hygiene.


Public Lands. See Homestead, Indian Territory, Pre-Emption, United States.

Public Prosecutor. See Prosecutor.

Public Schools. The nine great public schools of England are Eton, Harrow, Rugby, Winchester, Westminster, Shrewsbury, Charterhouse, St Paul's, and Merchant Taylors'. See the special articles on each, and Education.

Public Worship Regulation Act. See Ecclesiastical Courts.

Puccinottl, Francesco, author of the Storia della Medecina and of other works which give him a high place in medical literature, was born at Urbino in 1794, and, thanks to the Scopoli Fathers, was already an accomplished classical scholar when in 1811 he repaired to Pavia for a thorough course of mathematics, physics, and natural science, in which metaphysics, ethics, and civil and canon law were neglected. In these studies he passed on to that of medicine at the Roman University, and graduated with much distinction in 1816. The local malaria first engaged his attention. A work ardently opposing the prevalent Brunonian doctrine, and advocating a return to the rational medicine of Hippocrates, produced a salutary effect on his contemporaries, and was followed up by his able treatises on Pernicious Fever (1821) and on Inductive Pathology (1828). Academic honours now fell thick on him, and he passed from one medical name till, committed in the patriotic movement of 1831, he was deposed from the professorship of Pathology in the university of Macerata. Excluded from academia, he redoubled his literary activity, which bore fruit in his still classic treatises on medical jurisprudence and on law and public health and by these he earned himself an international reputation. In 1833-37 he made a special study of the cholera epidemic at Leghorn, at the same time giving to the world his masterly translation of Arcturus. In 1838 the Tuscan Archduke appointed him professor of Medical Jurisprudence in Pisa University, and there he published his Lezioni Speciali su Medicae Nervosi, his work on the Cachexie, and on the maladies induced by the rice-culture (Risisce) and, and above all, his masterpiece, the Storia della Medecina, in three volumes, representing the labour of twenty years. He died, 8th October 1872, in Florence, and, by special decree of the municipality, was buried in the 'Westminster Abbey of Tuscany,' the church of Santa Croce.

Puck, or Robin Goodfellow, a familiar figure in the fairy-world of old English folklore, immortalised by Shakespeare in the Midsummer Night's Dream. His characteristics, as kept alive by popular tradition in the merry tricks and mischievousness attributed to him, the name is really a generic term for a fairy, and we recognise it further in the Icelandic pucki, the Irish pooco, the Welsh pwyca, even the Cornish pizye, and the Puck and Nisse Puck of the Frisians and Danes. Pucke occasionally perform kindy domestic functions, are small and dwarf-like in appearance, attach themselves to particular households, and are easily propitiated by offerings of cream and kindly names like the Irish 'good people,' the Scots 'Puckie,' or a Norwegian 'Puk.' They occasionally assume the form of a horse, a hound, or the like, and are even confounded with such dancing lights as the Will-o'-the-Wisp or Jack o' Lantern. Obvious analogies suggest themselves with the Silesian Rubezahl, the Scotch Brownie, the Norse Troll, whose more malignant aspects connect them with the wider world of Demonology (q.v.). Robin Goodfellow once filled a prominent place in the popular imagination—we meet him at full length in the 1628 black-letter tract, Robin Goodfellow; his mad pranks and sly merrie way of haunt mort, and is a fit medicine for wantonly (repr. in Halliwell). Henslowe's Diary tells us that Chettle wrote a drama on his adventures; we find him again in Drayton's Nymphidia, Burton's Anatomy of Melancholy, Ben Jonson's Masque of Black Barts, and the Plays of Shakespeare. As Lob, Hobgoblin, and the Lubber-foend the allusions to him in our earlier literature are endless. The name Puck was taken for its title by the well-known New York counterpart to Punch.

See J. O. Halliwell's Illustrations of the Fairy Mythology of A Midsummer Night's Dream (Shakesp. Soc. 1845); W. J. Thoms's Three Notebooks on Shakespeare (1865); and W. C. Hazlitt's Fairy Tales, &c., illustrating Shakespeare and other English Writers (1875).

Pudd, or Pood, a Russian weight which contains 36 lb. avoirdupois (40 lb. troy). See Pound.


Puebla, the third city of Mexico, capital of a state of the same name, stands on a fruitful plain, 7120 feet above sea-level, and 68 miles (by rail 116) S.E. of the city of Mexico. In the vicinity are Orixala, Popocatépetl, and other lofty mountains. It was founded in 1561, and declared the handsomest towns in the republic, with broad, straight, clean streets; many of the houses, which are generally three stories high, have quaint fronts of red and white tile-work. The city contains nearly fifty churches, theological, medical, art, and normal schools, and museums of science, with museums of natural history dates from 1728, two large libraries, a number of hospitals, &c. On the great square stands the cathedral, a Doric building with two towers, the interior of which is decorated in the most sumptuous manner with ornaments of gold and silver, paintings, statues, &c. Puebla has a thriving trade, and an air of cheerful activity, not common in Mexico, pervades the place. In 1898 there were twenty-two factories; the chief articles produced are cottons, paper, iron, glass, porcelain, leather, &c. See Pop. (1905) 91,917.

Pueblia, capital of Pueblo county, Colorado, on the Arkansas River, at the mouth of Fountain Creek, 117 miles by rail S. by E. of Denver. Through its iron and steel industry it has rapidly become the second city of the state and an important railway centre; immense quantities of raw materials and fuel abound in the vicinity. The principal establishments are those of the Colorado Steel Company and Iron Company, which include two blast furnaces, steel-works, a rail-factory, bar- and nail-mills, and a pipe-foundry. In 1890 a Mineral Palace was erected to hold a permanent exhibit of Colorado's mineral productions—from stone and coal to pure gold—valued at almost $1,000,000. Pop. (1880) 3089; (1900) 24,747.

Pueblos (Span. pueblo, 'village'), a semi-civilised family of American Indians in New Mexico and Arizona, dwelling in large single habitations, which are sometimes capacious enough to contain a whole tribe. These edifices—which are often five stories high and 300 feet square—stretch over 433 yards long, with many rooms (53 to 124) on each floor—are commonly constructed of adobe or sun-dried brick; the ground-floor is invariably without doors or windows, entrance being effected by a ladder leading to the second story; and
indoors ladders take the place of staircases everywhere. A somewhat pyramidal aspect is given to the whole building by each successive story receding a few feet from the line of that below it. Each family in the town has a separate apartment, and there are also large rooms for general council-chambers and for tribal dances. In New Mexico there are nineteen such villages, with over 800 occupants, who are skillful agriculturists, employing irrigated districts in the cultivation of wheat, corn, potatoes, and beans. Spinning and weaving and the manufacture of pottery also are carried on. The Moquis of Arizona are a related tribe, numbering some 1800, in seven villages built on the summit of isolated hills. The Pueblos are under Roman Catholic missionaries, and are making steady progress in civilization and education, although on their Christianity they have grafted many of their old pagan beliefs and customs, to which they obstinately cling. They were first visited by the Spaniards about 1530, at which period their habits and their occupations were very much the same as to-day. It is evident, however, from the wide area over which the ruins of old pueblos and remains of ancient pottery have been found, that they were at one time very much more numerous than they are now.

**Pueblos National**, a town of Colombia, in Santander department, on the Rio Suarez, Coal and iron, and there are some trifling manufactures. Pop. 12,000.

**Puerperal Fever.** In its most general sense this term may be applied to any acute febrile disease affecting women during the puerperal or lying-in state. In this sense it might be taken to include the febrile states induced by the poisons of scarlatina, typhus, and other zymotics. But, while the zymotic poisons induce manifestations in the puerperal woman in some respects widely differing from the results of their action in the non-puerperal state, their features are quite distinct and recognizable, and the special characteristics of their action depend on the peculiar condition of the subject for the time being, and not on any difference in the specific character of the poisons. The term puerperal fever is now in its narrower sense restricted to that special acute febrile disease resulting from the septic infection of the puerperal woman, and may be considered to be synonymous with the term puerperal septicemia.

It is a frequent and much dreaded disorder, and accounts for a very large number of the deaths arising from child-bearing. Its dread character and symptoms were recognised by Hippocrates and by him regarded as due to the suppression of the lochia or discharge after childbirth—a view which held ground for nearly 2000 years—for in 1660 Sydenham taught practically the same opinion, from this time until 1847 various views as to its cause and nature prevailed. But in this year the true nature of the cause was recognised by Sumner of Oxford, who noticed that in a clinic in the maternity which he conducted, and which was attended solely by midwives, puerperal fever scarcely ever occurred, while in another attended by students, many of whom came straight from the dissecting-room, its ravages were almost universal. This led him to an analysis of his observations, that the students brought into the maternity a poison that induced in the women they attended and examined the disease, which was conspicuous by its absence in the clinic and attended by the midwives only. Abundant evidence has accumulated since that time, his views were correct, and it has been shown that of all the causes of this malady the poison termed "cadaveric" (i.e. derived from the decomposing dead body) is one of the most active and fatal. Modern research has shown us that the activity of this and other septic poisons is due to the influence of microbe organisms which act upon "cadaver," and we have reason to believe that a great variety of such germ-bearing substances exist, each capable of inducing the symptoms and condition which we recognise under the name of puerperal septicemia. Thus, while the results are to all intents the same, the causes may vary considerably in degree and nature. This poison-germ may be derived from a variety of sources; for example, the cadaveric poison already referred to, the pus from a septic abscess, sewage gas, &c. It would seem that the septic poison may be introduced into the system in two different ways, and this distinction has an important clinical and practical bearing.

1. The so-called Heterogenetic mode includes those cases in which the poison is applied to the tissues of the patient directly, as from the hands of the accoucheur. The microbe then enters the tissues and produces its effects by developing in and influencing the vitality of the tissues themselves.

2. The so-called Autogenetic mode. In this case a piece of the retained placenta, blood-clot, or slough remains in the genital tract. Putrefactive changes set in as the result of microbial infection, and the products of the putrefaction enter the system and act on the patient's system, and so on.

This is the case when the patient was as it were manufactured the immediate poison in her own body (hence the term). But it will be evident that in both the ultimate cause is the presence of microbial organisms. The symptoms may occur in from four days to three weeks after labor, accompanied by a rigor or 'chill,' followed by a rapid rise of pulse and temperature. Thereupon pain in the abdomen usually sets in and the lochia becomes fetid or suppressed. The local manifestation of the disease consists of inflammatory changes varying in kind, degree, and site. Almost all the organs may be involved, more especially the uterus, peritonium, kidney, liver, &c. In some cases the influence of the poison is so overpowering and rapid that death ensues before any gross change in the tissues occurs, but usually there is abundant evidence of the extent of the pathological changes.

Once the disease is fairly established the prognosis is grave in a high degree. The chances of recovery where the treatment is appropriate and vigorous are very much greater in the autogenetic variety than in the heterogenetic. The septic poison can be attacked, and the decomposing matter either entirely removed, or the putrefactive process stopped by the use of efficient antiseptics. Where the sepsis has been introduced directly (heterogenetic form) the possibility of direct interference is almost nil, and the matter resolves itself into a contest between the vitality of the victim and the activity of the poison, in which the former often succumbs.

The preventive treatment (prophylaxis) of this scourge is, however, one of the triumphs of modern medicine. Up to 1870 the special home of puerperal septicemia was the maternity hospital, and the atmosphere and furniture were saturated with the septic material derived from the emanations and excreta of previous patients. Such institutions were seldom long free from outbreaks of this scourge, and from time to time epidemics arose with their attendant virulent and virulent death-rate. After many cases of this character were examined, and all the known agencies eliminated, it was shown that the perils were still not nil. No better illustration of this advance can be found than the experience in the Royal Maternity Hospital of Edinburgh. In 1879 the new
PUERPERAL INSANITY

PUERTO DE SANTA MARIA 483

hospital was opened, and though it was constructed on the most advanced sanitary ideas several fatal cases occurred during the first three or four months after its opening. The source of the mischief was not discovered; this is the prevalent disease, when an antiseptic course was instituted in the management of the practice, and since then no single case of septicemia has occurred.

A similar result has been attained in the great maternity hospitals on the Continent, and indeed it defies remark, that the two most distinguished institutions in the world—the Great Maternity Hospital of London and the hospices of Geneva—have both been entirely free from this disease, since antiseptic practice has been adopted. The antiseptic practice more nearly perfect is the immunity from the disease. In no department of practical medicine have the discoveries and teachings of Lister produced more brilliant results. For while it might well have been said that until recently a woman entering a maternity hospital took her life in her hands, it now appears that since antiseptics in midwifery have been rigorously adopted a woman is actually safer in such an institution than in her own home. For while careful antiseptic practice is practically a routine in the hospital, it is apt to be faulty in a private house by reason of some constructional fault in the dwelling or ignorance or carelessness on the part of the attendants. And thus, while septicemia is practically stamped out of hospital practice, it is still far too frequent in the private house.

The chief points attended to in hospital practice are: (1) The thorough cleanliness of the bedding and clothes of the patient—all soiled articles being at once removed and disinfected before being washed. (2) The scrupulous cleansing of the wounds and the prompt and thorough dissection of the extreme personal cleanliness of all attendants—accoucheurs and nurses—the hands being carefully disinfected on every occasion before a patient is touched. (4) The rigid exclusion from the clinics of all who have been in attendance on infectious or septic cases or in the post-mortem or dissec ting rooms. (5) The prevention of septic absorption by the free use of antiseptic lotions and dressings. While such practice can, with due care, be constantly maintained in hospital, it is obvious that the conditions of private practice render its application more difficult; and while antiseptics have rendered the disease immensely less frequent, it is doubtful if we can hope for the almost complete immunity in private which we have attained in hospital practice.

Puerperal Insanity comprehends the forms of mental derangement which may attack a woman during or after pregnancy, childbirth, and the puerperal period. The occurrence of insanity during pregnancy is extremely rare; it is much more frequent during the early puerperium, and is liable to occur, but with less frequency, during the whole period of lactation. The affection presents many varieties, such as acute mania (which is probably the commonest), delusional mania, melancholia, &c. As regards frequency, it would seem that about 8 per cent. of all cases of insanity have a puerperal origin. This is derived from a very large number of cases, and the frequency in different places varies greatly. A very large proportion of the cases show a hereditary tendency to insanity, but it occurs to a great extent among those in whom no such taint can be recognised. Primiparas are more frequently the victims than those who have borne several children, and there seems no doubt but that it is more apt to appear in those whose physical state has become depressed from one cause or other.

Illegitimacy seems to exert a potent influence in the production of the disorder. This comes out in Clouston's statistics. He says that 25 per cent. of all insane puerperal women are unmarried. This apparent close relation may be somewhat misleading, because while these unfortunate are no doubt the subjects of great mental distress, and often of physical hardships leading to lowered vitality—conditions which certainly favour the development of this disorder—yet it must be borne in mind that nearly all cases are derived from the shelter of lying-in hospitals, from whose wards the statistics are chiefly derived. It may generally be said that a depraved state of the nutritive system precedes attacks of insanity, and whatever tends to induce this favours the development of an insane attack. The treatment of the attacks already become acutely maniacal. There is great excitement, incoherence, and often great and dangerous violence. There is continuous garrulity, and the language is frequently markedly profane or obscene. Violent explosions occur from time to time, often characterised by homicidal and suicidal tendency.

The melancholic form is characterised by an attitude and expression of great mental depression, speech is slow, and replies can only be elicited with difficulty. The eyes are lustreless and downcast, and the whole bearing suggests profound dejection. Suicidal attempts are not uncommon in the melancholic forms, and must always be guarded against. The symptoms usually appear within the first seven days after labour, and may develop with great rapidity. In both the melanocholic and maniacal forms there is a tendency to inversion of passions, the temper becomes coated, and the secretory and excretory functions are greatly disorders. Sleeplessness is very pronounced, and hysterical outbursts, delusions, and hallucinations occur, and mania or melancholia rapidly supervenes. It is satisfactory to know that in spite of the violence of this disorder the chances of ultimate recovery are very great. Upwards of 80 per cent. recover entirely.

Most of the maniacal cases get well within eight weeks, the melancholic within six months. In a small proportion of the cases recovery is deferred until nine months, after which the chances of complete recovery are considerably diminished. In this connection it should be noted that the rapidity of recovery depends on appropriate treatment being early begun. Experience shows that the majority of cases in which treatment is early begun get rapidly well, and that the chances of recovery are diminished in proportion as the treatment is deferred. Repugnant then as may be the removal of the patient to an asylum, there can be no doubt that, in the great majority of cases, this is the proper course to be pursued. With the fact that most of the cases have a suicidal or homicidal tendency which it is often difficult to guard against in a private house, and at the same time understands that early recovery depends on early treatment, the propriety of the patient's early removal scarcely admits of question.

See Clouston, Mental Diseases; Bevan Lewis, Textbook of Mental Diseases; Lloyd, 'On Insanity and Diseases of the Nervous System in the Child-bearing Woman' (American System of Obstetrics, vol. ii.).

Puerto Bello. See PORTOBELLO.

Puerto Cabello, a seaport of Venezuela, in Carabobo state, 78 miles W. from Caracas. It stands on a low, narrow peninsula on the Caribbean Sea, and has a safe, deep, and roo my harbor, defended by a fort and batteries. It is the port of Valencia, which is 34 miles distant by rail. There is an active foreign trade, which averages 12 or 13 millions sterling annually; the chief exports are coffee, cacao, cudi, cotton, sugar, divi-divi, and copper ore. Pop. 10,143.

Puerto Cortez, a port of Honduras (q.v.).

Puerto de Santa Maria, a seaport of Spain, stands at the mouth of the Guadalate, on the Bay of Cadiz, 22 miles by rail (all round the bay) NE. of Cadiz and 8 SW. of Xeres. It is one of the
principal export harbours for sherry, and manufactures silk, soap, hats, leather, spirits, beer, &c. The bull-fights here in May are among the most famous in the country. Pop. 22,125.

Puerto Plata, the chief port of the Dominican Republic, on the north coast of the island of Hayti. It has an open roadstead, but exports a good deal of tobacco, mahogany, sugar, coffee, cocoa, divi-divi, &c. The value of imports and exports varies from £230,000 to £300,000 a year. Pop. 6000.

Puerto Príncipe, a city of Cuba, 50 miles by rail W. of Nuevitas, its port on the north coast. It is the centre of a grazing and cattle-raising country, and is the largest inland city of Cuba. Pop. (1899) 25,102.

Puerto Rico. See Porto Rico.

Puff-adder (Clotho or Echis du aritana), one of the most venomous and dangerous vipers of South Africa. Its popular name refers to its habit of puffing itself up when irritated. It attains a length of 4 or almost 5 feet, and is often as thick as a man's arm. Its head is very broad; its tail suddenly tapered; its colour brown, chequered with dark brown and gray or white. The puff-adder is very sluggish, and often lies half buried in the sand of the desert, its head alone being raised above ground. Its poison is used by the Bushmen for their arrows. The River-jack (Clotho musiciar
tus) is also South African; the male bears a scaly spine between the nostrils.

Puffball (Lycoperdon), a Linnean genus of Fungi, now divided into many genera, belonging to the section Gasteromycetes. They mostly grow on the ground, and are roundish, generally without a stem, at first firm and fleshy, but afterwards powdery within; the powder consisting of the spores, among which are many fine filaments, loosely filling the interior of the peridium, or external membrane. The peridium finally bursts at the top, to allow the escape of the spores, which issue from it as very fine dust. Some of the species are common everywhere. Most of them affect rather dry soils, and some are found only in heaths and sandy soils. The most common British species is L. gemmatum, generally from one to two and a half inches in diameter, with a warty and mealy surface. The largest British species, the Giant Puffball (L. giganteum), is often many feet in circumference, and filled with a loathsome pulpy mass when young; but in its mature state its contents are so dry and spongy that they have often been used for stanching wounds. Their fumes, when burned, have not only the power of stupefying bees, for which they are sometimes used, in order to the removal of the honey, but have been used as an anaesthetic instead of chloroform. The same properties belong also to other species. Some of them, in a young state, are used in some countries as food, and none of them is known to be poisonous.

Puff-birds (Bucerotidae), a family resembling Kingdoms in form, but living on insects like Flycatchers; they also resemble the Bee-eaters, and are found only in South and Central America. See BARBIER, and Selater's Monograph of the Jacamars and Puff-birds (1882).

Puffendorf, Samuel, Baron von Puffen-dorf (or Puffendorf), writer on jurisprudence, was born on 8th January 1632. at Chemnitz, in Saxony. He began the study of theology at Leipzig, but in 1656 went to Jena to study national law and mathematics. Whilst acting as tutor to the sons of the Swedish ambassador at Copenhagen war broke out (1658) between Denmark and Sweden, and Puffendorf was thrown into prison. During the eight months he was kept there he thought out his Elementa Jurisprudentiae Universitatis. It was dedicated to the Elector Palatine, who appointed Puffendorf to the professorship of the Law of Nature and Nations at Heidelberg.

He next exposed the absurdities of the constitution of the Germanic empire in De Statu Republicæ Germanicae (1667), which raised a storm of controversy. In 1670 he was called to fill the chair of the Law of Nations at Lund, and there wrote the work on which his fame now rests, De Jure Naturæ et Gentium (1672), a work based upon the system of Grotius (q.v.), but completed and extended in the line of Hobbes' speculations. Some years later the king of Sweden made him his historiographer, with the dignity of a councillor of state. In his official character he published a dry history of Sweden, from the expedition of Gustavus Adolphus into Germany to the death of Queen Christine. In 1688 the Elector of Brandenburg invited him to Berlin to write the history of the life and reign of the Great Elector. He died in that city on 20th October 1694.

See Lorimer, Institutes of Law of Nations (vol. i. 1883); H. von Treitschke, in Preussische Jahrbücher (1875); and Droysen, Abhandlungen zur neueren Geschichte (1887).

Puffin (Fratercula), a genus of birds of the Auk family, characterised by a gaily-coloured bill—red, orange-yellow, and bluish gray—with a horny frontal sheath divided by transverse grooves into several distinct pieces. At the end of the breeding season these furrows deepen, and the sheath is shed. There is in fact an annual moult of the bill-sheath and of the horny plates above and below the eyelids. In form, size, and colour the new bill-sheath differs markedly from the old one. The genus Fratercula embraces three

Puñían (Fratercula arctica).
species, of which only one, the Common Puffin (F. arctica), a bird a little larger than a pigeon, frequents the rocky shores of the Atlantic Ocean. It occurs in many parts of England and in Wales, while on the coast and islands of Scotland and Ireland—it is often abundant. A similar state of things occurs in the breeding season, when the birds congregate in large colonies. The egg, which is of a dull white marked with pale brown or lilac, is laid sometimes in a crevice of a cliff, sometimes in the burrow of a rabbit, or in a cavity made for the purpose. The nest, which is covered with scotty blackdown, remains in the nest for three weeks, and is fed on small fishes. The adult birds feed on crabs, crabs and other marine animals. On land they waddle rather than walk, but they swim and dive well, and their flight is rapid though seldom high. In various localities the puffin is popularly called "Sea-parrot," "Coulternb," and "Tammienorie." In the Pacific the genus is represented by the Horned Puffin (F. corniculata). There also is found the closely allied genus Lunda, with bright yellow bill. The legs of the puffin are naked and provided with a fan of the young birds is used as food. For details as to the strange moulting and renewal of the bill, see Zoologid (July 1878).

**Pugilism.**

This breed of dog is generally supposed to have been brought over from Holland, where it is very common. Its origin there is unknown. The pug may be described as a miniature bulldog, though it differs in the shape of his ears, which should fall forward like a terrier's, and of his tail, which should curl tightly against his quarters. The broad under-jaw and wide skull of the bulldog are rarely seen, but should be present in a perfect specimen. Some years prior to 1860, when the race was for the first time exhibited, Mr. Morison of London and Lord Willoughby d'Eresby paid great attention to the breeding of pugs, and founded two distinct strains known as the Morison and Willoughby pugs. Large prices were paid for pure specimens of either strain, but when the fashion in ladies' dogs took another direction prices came rapidly down. The two strains have been so often recrossed that it is difficult to obtain a pure specimen now. The pug is only fit for a house-dog, as he is useless for any active work. Beyond a ten-pound package he is well provided for this, as his short, smooth coat is easily cleaned, and he is a handy size.

**Pugnacous.**

To trot as our ancestors did. A special explanation is required to show what boxing is; every one knows that it is fighting—real or mimic—with the hands alone, all weapons being foreign to the "science." As pugilism, in what has always been its highest standard—prize-fighting—is now supposed to be our national sport, it is perhaps to give a brief sketch of its past, when it played a more important part—or was thought to do so—than it does now in the formation of the national character.

Although now the taste for it seems quite as firm and as general in the United States, England has been emphatically the home of pugilism; and it is certain that in no other country at any time was such a fair, manly, and humane system of combat established as that under which the English settled their quarrels, especially after the rules of the prize-ring were issued. These, known now as the "old rules," dated from the time of the first recognized champion of England, in whose name they were framed to regulate a new and popular form of piping, and as a necessary consequence, in all others, the P.R.—an accepted abbreviation for Prize Ring—being the standard authority in such matters, the royal academy of athletes, as it were. This was soon after 1740, and the rules held good for nearly a century; and although they were revised, entirely in the direction of diminishing the danger of such contests. At the same time it should be remarked—and those unacquainted with the subject may possibly be surprised to learn—that fatal results to prize-fights were extremely rare, and in most instances occurred through what may be termed accidental or secondary causes. In Broughton's rules "minute time" was allowed between the rounds—each bout of the struggle being called a "round," and lasting until one or both of the men were down; but this was altered in the new rules to a minute or two. The rules were so framed that if a man could not recover himself sufficiently in that time to face his antagonist he must be so weak or stupified that further fighting would be dangerous. In Broughton's time, too, the second man was allowed to show his principles to the "scratch;" this was forbidden by the new rules on the same grounds as the previous alteration. The purpose of both sets of rules was to secure fair-play and to foster a kind of rude chivalry, objects not without value when we remember the principles most of the men were taught under their influence, and the angry quarrels either code was intended to regulate. No man was to be struck while he was down; and no man might be struck below the belt—the belt in practice being a handkerchief tied tightly round the waist. With prize-boxers these handkerchiefs were the "natures" of the men, chosen by themselves and worn by their partisans. Kicking, biting, and the horrible "gogging"—once so frequent across the Atlantic, but now happily seldom heard of, owing to the spread of pugilism—were all "foul," and their practice instantly lost a man the box; if two rounds, were two seconds, or, as they were sometimes called, bottle-holders, to each man: their duty was to lift their principal when he fell; to carry him to his corner—always selected by tossing a coin, the winner of the toss naturally choosing the corner of the ring which placed him with his back to the sun; to sponge or sprinkle him with water; to wipe the perspiration or blood from his face; and, as their second title implies, to refresh him with sips from the water or brandy bottle. They used also to carry in their jacket pocket a supply of powdered resin, which the boxer would rub on his hands to enable him to clench them tightly when he grew tired; but this practice was made "foul" by the new rules. The "scratch," to which allusion has been made, was a mark in the centre of the ring which the combatants instantly lost a man the box; to give vent anything like a sudden rush by either of the men upon his unprepared face. The "ring" itself was a square of 24 feet, marked out by four corner and four middle stakes, round which ran two ropes at a height from the ground of 2 and 4 feet respectively.

For many years prize-fighting maintained an enormous popularity, and an existence which, if not actually legal, was scarcely to be distinguished
from it. The popularity perhaps remains, but the legality or the want of it is so settled that the P.R. is generally regarded as a thing of the past; and even boxing may be prohibited. "Boxing" was once equivalent to "pugilism," the general term for "fistic" manoeuvres, but is now almost exclusively used for contests with pugilist's gloves. These, of course, are used to prevent the injuries which the naked knuckles might inflict, although a very respectable amount of punishment can be dealt out with the largest gloves. Broughton was followed by a series of champion contests, the most famous were fought by John Jackson (1769-1845)—known as Gentleman Jackson; John Bogle; Tom Cribb (1751-1848), the most fearless, honest, and simple-minded of gladiators; Spring; and Tom Sayers (1806-43), with whom the series practically closed. All these have been honoured with handsome monuments, especially Jackson and Cribb, who lie respectively in Bromley Cemetery (London) and Woolwich churchyard; while the funeral of Sayers was almost a national demonstration, the heterogeneous procession which followed being one of the largest ever seen even in London. Another boxer, John Gully (1785-1863), might have been champion, but he retired from the ring and actually became M.P. for Pontefract (1832-37), an owner of extensive coal-mines, and, what to many of his admirers was a fact of much relief, his racers thrice won the Derby; and he began life as a journeyman butcher! The popular idol at one time was Jack Shaw (1789-1815), the life-guardsman, a pugilist of herculean strength, but not so polished in science as some of his competitors. His patrons offered to buy him out of the regiment when it was ordered abroad, and to back him for the championship; but the heroic guardsman refused, and, with thousands of his comrades, fell in winning the crown of victory for his country. It is said that he killed, or almost killed, the Duke of York, in a prize fight. The great Duke of Wellington was his firm supporter; Sir Robert Peel and Lord Palmerston lent their influence to him, and Lord Byron, who was a pupil of Don Juan, George Borrow's fight with the "Fainting Timman" is truly Homeric; and he landed boxing as he landed all things English. Thackeray, too, whose nose is said to have been broken in a school fight with a very church dignitary, devoted one of his Roundabout Papers to the fight between Sayers and Heenan. It would occupy too much space to continue this catalogue of admirers, but did we do so it would show how different was the popular taste of thought not so very long ago.

Pugilism. The P.R. undoubtedly claim to have furnished an item in English history; for when the allied sovereigns visited London after the peace of 1814—the most important and brilliant gathering of potentates on record—it was deemed fitting by the English to display their art of boxing, supported by the best pugilists of the day—a display greatly admired by the visitors. A year or two later the Grand-duke of Prussia saw a prize-battle and shook hands with the victor. The Shah of Persia in 1823 was also greatly delighted with a similar exhibition. The result of all this was a display of the necessities of the establishment of police in every county of England, which rendered it well-nigh impossible to 'get a fight off;' the leading patrons of the sport withdrew disgusted at the continual disappointment, leaving the boxers to the influence of a very different set. From the absence of any legal restraint, there had always been danger of disorder and riot, to check which no adequate force could be provided; yet latterly such scenes grew more frequent and worse in character, so that the demand from its opponents for the suppression of the ring gained in strength, while the efforts of those who would preserve it were proportionately weakened.

As with most other extensively followed games, the prize-ring had a dialect of its own, a "flashing," a few specimens of which may amuse the reader. The fists were "mamlez," and when both boxers struck with the same hand at the same time, the blow was called, aptly enough, a "counter-hit," or only a "counter." When one struck with the right and the other with the left at the same time, the blow was a "cross counter." 'Countering' was the most exciting, and the severest mode of inflicting punishment.

In consequence of the police difficulties attending prize-fights on the old lines, they have gradually drifted into exhibition matches, in which the "gate" is an important factor. These fights are conducted under the Queensberry rules, so called from the marquess of Queensberry, to render boxing an elementary sport. They modify the conditions considerably, and so gloves are used (thickly stuffed, from 4 to 6 ounces in weight) they are nominally boxing contests and are presumably legal. They generally end in one of the combatants being "knocked out"—that is, rendered incapable of bearing up, upon which the referee continue the fight. A blow on the point of the jaw or on the heart or stomach is the usual method of accomplishing this end. They are generally conducted under the auspices of some athletic club on a platform enclosed with a 24-foot ring, a charge being made for admission. There are very popular in the United States, where the biggest fights have taken place, such as that in which Fitzsimmons beat Corbett in 1897, and when Jeffries beat Fitzsimmons in 1899. In the latter case the money drawn for admission amounted to $75,000 ($15,000), of which sum over £12,000 was divided between the pugilists.

See Egan's Roxiana (5 vols. 1818); Fistiana (1863); American Fistiana (New York, 1876); Pendragon, Modern Boxing (1878); H. D. Miles, Pugilistica (2 vols. 1880); J. B. O'Reilly, Ethics of British and American Sport; and Parker and Groves' Fencing, Boxing, and Wrestling (Bathminton Library, 1889); G. K. Allanson-Wilm, Boxing (Isthmian Library, 1897).

Puigin, Augustus Welby, architect, was born in London on 1st March 1812, the son of a French architect, Augustin Puigin (1792-1832), in whose office, after schooling at Christ's Hospital, he was trained, chiefly by making drawings for his father's books on Gothic buildings. Whilst working with Sir C. Barry he designed and modelled a large part of the decorations and sculpture for the new Houses of Parliament (1836-37). Early in life he became a convert to Roman Catholicism: and most of his plans were made for churches and other ecclesiastical edifices belonging to that communion, the most successful being perhaps a church at Ramsagate, Killarney Cathedral, Athlone Hall in Ireland, and the Roman chapel at Douai. He died insane at Ramsagate, on 14th September 1832. He enriched the literature of his profession by Contrasts . . . between the Architecture of the 15th and 19th Centuries (1836), a Treatise on Church Screens (1851), and The True Principles of Christian Architecture (1841). B. Ferrey's Recollections of A. W. Puigin and his Father (1861).

His son, Edward Welby Puigin (1834-75), succeeded to his father's practice, and was the architect of many Roman Catholic churches, &c.

Pug-mill. See BRICK.

Puisne Judges. See COMMON LAW.
Pulaski, Casimir, a Polish count who fell in the American revolution, was born in Podolia, 4th March 1748, took an active part in the war against Russia, and lost his estates and was outlawed at the partition of Poland in 1772. In 1777 he went to America, and for his conduct at the Brandywine was given a brigade of cavalry, which he commanded until March 1778. He then organised 'Pulaski's legion,' a corps of lancers and light infantry, in which he enlisted even prisoners of war and deserters. In May 1779 he entered Charleston, and held it until the place was relieved; a furious assault which he had made on the British was repelled, but he afterwards followed and harassed them until they left South Carolina. At the siege of Savannah on the 9th of October he fell in the assault at the head of the cavalry, and died on board the brig Wasp two days later. In 1824 Lafayette laid the corner-stone of a monument to Pulaski, in Savannah, which was completed in 1835.

Pulci, Luigi, an Italian poet, born at Florence, 3d December 1432, and died in 1454 (or 1457), was an intimate friend of Lorenzo de' Medici and of Politian. He is the author of a celebrated poem, Il Morgante Maggiore ('Margante the Giant'), a burlesque epic of which Roland is the hero. This poem is one of the most valuable sources for the early Tuscan dialect, the niceties and idioms of which have been borrowed by Pulci with great skill (see Italy, Vol. VI. p. 254). The first edition appeared at Venice in 1481, and the book has since been frequently reprinted. Pulci wrote further a humorous novel (printed in Classici Italiani, Milan, 1804) and several humorous sonnets.—His brother Bernardo (born circa 1430) wrote an elegy on the death of Simonetta, mistress of Julian de' Medici, and the first translation of the Eclogues of Virgil.

—Luca, another brother (born 1431), wrote a poem in honour of Lorenzo de' Medici's success in a tournament; II Cirillo Calvaniaco, a metrical romance of chivalry; Drino d'Amore, a pastoral poem; and Epistle Eroiche.

Pulex. See Flea.

Pulcent, a town of British India, 20 miles N. of Madras, the first settlement of the Dutch in India; pop. 4067. It stands on an island in a large inlet of the sea called the Lake of Pulcent.

Pulkowo, a village of Russia, 10 miles S. of the site of a magnificent observatory (59° 46' 18" N. lat. and 30° 19' 40" E. long.), the 'St Petersburg observatory,' built by the Czar Nicholas in 1828-30. In 1882 one of the largest telescopes in the world was erected here.

Pulley, one of the mechanical powers, consists of a wheel, with a groove cut all round its circumference, and movable on an axis; the wheel, which is commonly called a sheave, is often placed inside a hollow cylinder of wood called a block, and by the sides of this block the extremities of the axle of the sheave are supported; the cord which passes over the circumference of the sheave is called the tackle. Pulleys may be used either singly or in combination; in the former case they are either fixed or movable. The fixed pulley (fig. 1) gives no mechanical advantage; merely changes the direction in which a force would naturally be applied to one more convenient; thus, W can be raised without lifting it directly by merely pulling P down. The single movable pulley, with parallel cords, gives a mechanical advantage = 2 (fig. 2); for a little consideration will show that, as the weight, W, is supported by two strings, the stress on each string is \(\frac{1}{2}W\), and the stress on the one being supported by the hook, A, the power, P, requires merely to support the stress on the other string, which passes round C. The fixed pulley, C, is only of service in changing the naturally upward direction of the power into a downward one. If the strings in the single movable pulley are not parallel there is a diminution of mechanical advantage—i.e. P must be more than half of W to produce an exact counterpoise; if the angle made by the strings AB and DC is 120°, P must be equal to W; and if the angle be greater than this there is a mechanical disadvantage, or P must be greater than W. The following are examples of different combinations of pulleys, generally known as the first, second, and third systems of pulleys. In the first system one end of each cord is fastened to a fixed support above; each cord descends, passes round a pulley (to the lowest of which the weight, W, is fastened), and is fastened to the block of the next pulley, with the exception of the last end which passes round a fixed pulley above, and is attached to the counterpoise, P. The tension of a string being the same in all its parts, the tension of every part of the string marked (1) in fig. 3 is that which is produced by the weight of P; consequently, as the last movable pulley is supported on both sides by a string having a tension, P, the tension applied in its support is 2P. The tension of the string marked (2)

\[\text{Fig. 1.}\]

\[\text{Fig. 2.}\]

\[\text{Fig. 3.}\]

\[\text{Fig. 4.}\]

\[\text{Fig. 5.}\]

is therefore 2P, and the second movable pulley is supported by a force equal to 4P. It may similarly be shown that the force applied by the strings marked (4) in support of the last pulley (which is attached to W) is 8P. Hence we see that, according to this arrangement, 1 lb. can support 4 lb. if two movable pulleys are used; 8 lb. if there are three movable pulleys; 16 lb. if there are four movable pulleys; and if there are no movable pulleys 1 lb. can support 2 lb. It must be noticed, however, that in practice the weight of the cords, and of the pulleys, and the friction of the cord on the pulleys must be allowed for; and the fact that in this system all these resist the action of the power, P, and that to a large extent, has rendered it of little use in practice.—The second system is much inferior in producing a mechanical advantage, but it is found to be much
more convenient in practice, and is modified according to the purpose for which it is to be used; two prevalent forms are given in figs. 4 and 5. In this system one string passes round all the pulleys, and, as the tension in every part of it is that produced by the weight of \( P \), the whole force applied to elevate the lower block with its attached weight, \( W \), is the weight \( P \) multiplied by the number of strings attached to the lower block; in fig. 4 \( W = 4P \), and in fig. 5 \( W = 6P \); the pulleys in the upper block are being only of use in changing the direction of the pulling force. This system is the one in common use in architecture, in dockyards, and on board ship, and various modifications of it—such as White’s pulley, Smeton’s pulley, &c.—have been introduced; but the simpler forms shown above have been found to answer best. The third system (fig. 6) is merely the first system inverted, and it is a little more powerful, besides having the weight of the pulleys to support the power, instead of acting in opposition to it, as in the former case. The mechanical advantage can be traced out by finding from the form of the combination the ratio between the run of the tackle over the last sheave and the vertical ascent of \( W \), when motion is set up. Theoretically, the larger the number of movable pulleys in any one combination the greater is the mechanical advantage afforded by it; but the enormous friction produced, and the want of perfect flexibility in the ropes, prevent any great increase in the number of pulleys.

Pullman, George Mortimer, the inventor of the well-known ‘cars,’ was born in New York state in 1831, engaged in the business of moving and raising bulk hemp, and in 1859 and 1860 designed and built his first sleeping-car, but in 1863 the first on the model with which his name is now associated (see RAILWAYS). The Pullman Palace-car Company was formed in 1867, under his presidency, and now works nearly 1500 cars. In 1880 he founded an industrial town near Chicago, named Pullman, which has since been absorbed. On the 19th of October 1897 he dropped down dead in the streets of Chicago.

Pulmonaria. See Lungwort.
Pulmonates. See Gasteropoda.
Pulo-Penang. See Penang.
Pulpit. (Lat. pulpitum), an elevated tribune or desk, from which sermons are heard, and other solemn religious addresses are delivered. In great churches the pulpit is commonly placed on the north side of the nave against the wall, or in juxtaposition with a pillar or buttress (see also AMBO). The pulpits of the Low Countries and of Germany are often massive, lofty, and elaborately carved in wood and stone, frequent subjects for ornament being the Conversion of St Paul, the Call of Peter and Andrew, and Adam and Eve (as in the wood-carved pulpit by Verbruggen in St Gallihe at Brussel). Sometimes the canopied or sounding-board is the part most elaborately adorned by carving in wood or stone, as in the pulpit at Fotheringhay, Northamptonshire. Amongst the masterpieces of Nicolo Pisano are the beautifully wrought marble pulpits of the baptistery at Pisa, and of the cathedral at Siena. Some are adorned by bronze-work. The pulpit

(in Arabic, mimeter) forms one of the scanty appliances of Muhammadan worship. See Doolman’s Examples of Ancient Pulpits in England (1849).

Pulque, a favourite beverage of the Mexicans and of the inhabitants of Central America and some parts of South America; made from the fermented juice of different species of Agave (q.v.).

Pulsatilla, or Pasque Flower, a species of Anemone (\( A. \) pulsatilla), of the natural order Ranunculaceae. The species is a perennial herb with doubly pinnate or doubly trifoliate leaves, and a single one-flowered scape. It is narcotic, acid, and poisonous. The pulsatilla is a native of many parts of Europe, and of chalky pastures in several parts of England. It has widely bell-shaped bluish-purple flowers. Other species of Anemone have similar properties, \( A. \) pratensis and \( A. \) petens, the former a native of Europe generally, the latter of Siberia. They all emit, when bruised, a pungent juice, and contain, as their principal constituent, a peculiar pungent essential oil, which, in combination with Anemoniac Acid, forms an acid and very inflammable substance called Anemonic or Pulsatilla Camphor, and is sometimes used in medicine. Pulsatilla is a favourite medicine of the homeopathicists. Easter eggs are coloured purple in some places with the petals of the pasque flower.

Pulse (Lat. pulse), a name for the edible seeds of leguminous plants, as cori is the name for the edible seeds of grasses. Peas and beans are the most common and important of all kinds of pulse; next to them may be ranked kidney-beans, lentils, chick-peas, pigeon-peas, &c. The best kinds of pulse are very nutritious, but not easy of digestion, and are very apt to produce flatulence.

Pulse (Lat. pulsus, ‘a pushing or beating’). The phenomenon known as the arterial pulse or arterial pulsation is due to the distension of the arteries consequent upon the intermittent injection of blood into the arterial trunks, and the subsequent contraction which results from the elasticity of their walls. It is perceptible to the touch in all excepting very minute arteries, and, in exposed positions, is visible to the eye. The pulse is usually examined at the radial artery at the wrist, the advantages of that position being that the artery is very superficial, and that it is easily compressed against the bone. It is usual and convenient, though not quite accurate, to include under the term the conditions observed between the beats, as well as those produced by them.
The condition of the pulse depends mainly on two factors, each of which may vary independently of the other: first, the contraction of the heart, which propels the stream of blood along the artery; and second, the resistance in the small arteries and capillaries, which controls the rate at which it leaves the artery. The first determines the frequency and rhythm of the pulse, the force of the beats; but the tension of the artery between them and their apparent duration depend mainly upon the peripheral resistance. 'Feeling the pulse,' therefore, gives important information besides the rate of the heart's action, and implies more tense or relaxed condition. Dr Broadbent says, 'A complete account of the pulse should specify (1) the frequency—i.e., the number of beats per minute, with a note of any irregularity or intermission or instability of the rhythm; (2) the size of the vessel; (3) the degree of tension of the artery between the beats; (4) the character of the pulsation—whether its access is sudden or gradual, its duration short or long, its subsidence abrupt or slow, note being taken of diastole when present; (5) the force or strength of the beat, and the consistency and pressure within the artery, as measured by its compressibility; (6) the state of the arterial walls.'

The frequency of the pulse varies with age, from 130 to 140 per minute at birth to 70 to 75 in adult males, and with sex, being six or eight beats more in adult females. In some individuals it deviates considerably from this standard, and may even be habitually below forty or above ninety without any signs of disease. It is increased by exertion or excitement, by food or stimulants, diminished in a lying posture or during sleep. In disease (acute hydrocephalus, for example) the pulse may reach 130 or even 200 beats; or, on the other hand (as in apoplexy and in certain organic affections of the heart), it may be as slow as between thirty and twenty.

The normal regular rhythm of the pulse may be interfered with either by the occasional dropping of a beat (intermission), or by variations in the force of successive beats, and in the length of the intervals separating them (irregularity). These varieties often occur in the same person, but they may exist independently. In some individuals the regularity of the pulse is natural to some persons; in others it is the mere result of debility; but it may be caused by the most serious disorders, as by disease of the brain, or by organic disease of the heart.

The other qualities of the pulse are much more difficult to recognise, though of no less importance.

The degree of tension or resistance to compression by the fingers varies greatly: in a soft or 'low-tension' pulse the artery may be almost imperceptible between the beats; in a hard or 'high-tension' pulse it may be almost incompressible. An unduly soft pulse is usually an indication of debility; an unduly hard one is most characteristic of disease of the Kidneys (q.v.) and gout. But the tension, like the frequency of the pulse, undergoes considerable variations within limits from temporary causes, and may in certain individuals be habitually above or below the average without actual disease.

The force of the beats is a measure of the vigour and efficiency of the heart's action. A strong pulse is correctly regarded as a sign of a vigorous state of the system; it may, however, arise from hyper trophy of the left ventricle of the heart, and remain as a persistent symptom even when the general powers are failing. As strength of the pulse usually indicates vigour of the constitution, it is an index of debility. Various expressive adjectives have been attached to special conditions of the pulse, into the consideration of which our space will not permit us to enter. Thus, we read of the jerking pulse, the aching pulse, the hammering pulse, the wiry pulse, the thrilling pulse, the rebounding pulse, &c. The full significance of changes of the pulse in disease can only be appreciated by considering them in connection with the other signs and symptoms of the case. See Medicine (Vol. VII, p.115). Circulation, Heart, Pulsation, and especially The Pulse, by Dr Broadbent (1899).

Pulsometer. See PUMPS.

Pulszky, Francis Aurelius, Hungarian politician and author, was born at Eperjes, 17th September 1814, and after a course of legal studies travelled abroad, publishing (1837) a successful book on England. In 1848 he was appointed to a government post under Esterhazy, but, suspected of sharing in the revolution, fled to London, where he wrote for the papers. When Kossuth came to England Pulszky became his companion, and went with him to America (described in White, Red, and Black, 1852). His wife wrote Memoirs of a Hungarian Lady (London, 1850), and Tales and Travels of Hungary (1851). He was condemned to death by the Austrian government in 1852, but, after living in Italy from 1852 to 1866, was pardoned in 1867. He has sat in the parliament, and been director of museums and libraries throughout the country. His autobiography, in six volumes (1879—82) were translated into German. See F. W. Newman, Reminiscences of Tito Ezeler (1889).

Pultney, William, Earl of Bath. This statesman, descended from a Whig family, was born in 1684, the son of Sir William Pultney, member for Wiltshire (1659—79). He was a student of Christ-Church College, Oxford, where his oratorical power was early displayed. He entered parliament as member for Heydon, Yorkshire, and was a most graceful and brilliant speaker, full of epigram, and a master of all the arts of parliamentary attack. At first, and for many years, the friend and colleague of Walpole, he finally became so disgusted with that minister's indifferrence to his claims that in 1728 he placed himself at the head of a small group of malcontent Whigs, styled the 'Patriots,' and was henceforth Walpole's bitterest and most implacable opponent, being the leader of the coalition against him in the Commons as Carteret was in the House of Lords. He was Bolingbroke's chief assistant in the paper called the Craftsman, which involved him in many civil and legal complications, and speedily made some of his finest pamphlets. In 1731 he wrongly ascribed to Lord Hervey the authorship of a seditious pamphlet; a duel was the consequence, fought with swords in St James's Park, when both combatants were slightly wounded. On the resignation of Walpole in 1741 Pultney was sworn of the Privy-council, and soon afterwards created Earl of Bath; and from that time his popularity was gone. Horace Walpole places him amongst his Royal and Noble Authors, but though his prose was effective as a pamphleteer and his verse graceful, he was probably still better known as the author of a once popular political song, 'The Honest Jury, or Caleb Triumphant,' than by his more serious writings. He died in 1764, a wealthy but disappointed man. See Lecky, History of England, ii. 417 et seq., and Walpole, Letters, of Horley.

Pultowa, or Pol'uta'ya, a town of Russia, situated on a tributary of the Dnieper, by rail 88 miles SW. of Kharkoff and 449 NE. of Odessa. It manufactures tobacco and leather, and has four annual fairs, the most important in July, when cloth, horsehair, leather and hides, and coarse woollen and other stuffs are sold to the amount of £2,500,000 annually. Pop. 43,214. The town is a
PULTUSK, a town of Poland, 32 miles N. of Warsaw. Here Charles XII. of Sweden defeated the Swedes, on 26th December, 1809, was a fierce battle between the Russians and the French, the latter being ultimately victorious. The town was destroyed by fire in 1875. Pop. 16,946.

Pulvermacher's Chains. See Electricity (Mechical).

Puma, or Couguar (Felis concolor), a large Cat distributed in North and South America between 60° N. and 50° S. lat., but rare in these parts which have been long settled. It is sometimes called the American 'lion,' 'panther,' ('pantier'), or 'catamount,' and is about the size of a leopard. The Fur is thick and close, dark yellowish red above, lighter on the sides, and reddish white on the belly; the muzzle, chin, throat, breast, and inside of the legs are more or less white. But the colouring varies a little in different localities. Young pumas have dark brown spots in three rows on the back, and scattered markings elsewhere. The long tail is covered with thick fur, and is slightly coiled. The pumas have very diverse haunts—the forest, the bush, and the grassy pampas; they have no fixed lairs, but roam about by night from place to place in search of prey. They are agile in their movements, and can leap and spring well, but swim only under compulsion. Many kinds of mammals fall victims to the pumas, and they are the more disastrous to flocks and herds because of their habit of killing many more than they devour. To thebooty which they have secured but merely tasted they will afterwards return. They rarely attack man, but one puma has been known to kill fifty sheep in a night, drinking a little of the blood of each; hence their extermination in many regions. The two sexes live apart, but pair in winter and return to the woods. Some young are born at once, and are left a good deal to themselves, though after the first birth the mothers are certain affectionately. In spite of its restless and voracious instincts the puma may be readily tamed, and is said to become gentle. The skin is sometimes used for the occasional extirpation.

Pumice, a general term for the cellular, spongiform, filamentous, or froth-like parts of lavas. This highly porous and froth-like structure is due to the abundant escape of vapours through the rock while it was in a state of fusion. Under the microscope the rock is seen to be a glass, crowded with minute gas or vapour cavities and abundant crystallites. Owing to its porous structure pumice readily floats in water. It is usually a form of some highly acidic lava, such as obsidian; but now and again basic lavas give rise to pumice (Canyon Island, Hawaii). The latter is dark brown or black, and only abundantly frothy; the former, which is much the more common, is white or gray, and sometimes yellow. It is a hard but brittle rock, and is much used for polishing wood, ivory, metals, glass, slates, marble, lithographic stones, &c., in preparing vellum and parchment, and for lifting new cars and calceolarias. Great quantities are exported from the Lijari Isles; and that from the quarries in the Peak of Teneriffe, 2000 feet above sea-level, is better and cheaper. Pumice occurs as the crust of some kinds of lava, and in the form of clouds or shelves during volcanic eruptions. Sometimes immense quantities are thrown into the sea and are often floated for great distances. Eventually the cinders get water-logged and sink to the bottom. Abundant fragments were dredged up from abyssal depths by the Challenger expedition. After the eruption and earthquake in the Straits of Sunda in 1883, the seaport of Folok Batoing was closed with a barrier of pumice 19 miles long, two-thirds of a mile broad, and from 13 to 16 feet deep.

Pumpenickel, a kind of rye-bread (made of unbolted flour), much used in Westphalia. The etymology is disputed.

Pumpkin. See Gourd.

Pumps, machines for lifting liquids to a higher level, include (1) the Lift or Suction Pump, (2) the Lift and Force Pump, (3) the Pneumator, (4) the Chain-pump, (5) the Spiral Pump, (6) the Centrifugal Pump, (7) the Jet-pump, (8) the Persian Wheel, (9) Scoop-wheels.

(1) The Lift or Suction Pump (fig. 1).—A is the cylinder (the 'barrel'), closed or open at the top; B is a pipe (the 'suction-pipe') communicating with the water to be raised; C is a 'discharge-pipe,' which may be reduced to a mere spout; D is a valve, opening upwards only; E is another valve, also opening upwards only, and borne by F; G is the 'bucket,' a hollow cylindrical piece of wood or metal which is made, by leather or by hemp or other packing, to fit the barrel just so closely that it cannot travel between the bucket and the barrel; G is the piston-rod, driven by hand, steam, windmill, or animal power, and moving the bucket upwards and downwards in the barrel. Each upward stroke of the piston at first lifts air, of which none can travel back past the bucket; as the partial vacuum is produced in B, water ascends in B until the external atmospheric pressure is balanced by the partial atmospheric pressure below G. The force of a weight of the water column in B, as F now descends, air gets to the upper side of the valve, and is lifted on the upstroke, and so on: so that, if the valve D be not more than at most 33 feet above the water below (in practice 25 feet or less), water will be, step by step, pushed up B by the external atmospheric pressure until the valve D is under water; thereafter the succeeding strokes of the pump operate on the water above D and force it up the discharge-pipe, C, the external atmospheric pressure keeping the space below D filled with water. The power expended is applied (1) in lifting water; (2) in overcoming the pump-friction; (3) in overcoming the water-friction; and, (4) where the pump is ill-shaped, in producing eddies and broken water. A lift-pump must be very carefully proportioned and constructed in order to utilise, in water-lifting, one-half of the whole power expended in working it. Such pumps must work slowly, so that the valves may close properly; and an air-vessel is, if C be not a more powerful spout, required to minimise shock and render the outflow less intermittent, by the compression and elastic expansion of the air contained in it. The outflow is also regulated by driving two or three pumps off the same shaft and properly timing their relative motions.
(2) **The Lift and Force Pump** (fig. 2).—The piston is solid, and the valve $E$, instead of being carried by the piston, is fitted in the discharge-pipe. During the downward motion of the piston water is forced past the valve $E$; it cannot return; and water may thus be forced to considerable heights. Sometimes (fig. 3) the piston is made to fit, not the barrel, but the stuffing-box, $B$, which can be tightened down on it so as to make the fit good. An air-vessel, or a loaded hydraulic press called an 'accumulator,' is fitted on the discharge-pipe so as to minimise shock and intermitence; and double pumps are very generally employed, directly driven by steam-engine pistons or driven by a flywheel. Force-pumps are used for deep wells and mines, hydraulic presses, boiler feeds, cressoting timber, hydraulic lifts, steam fire-engines both land and marine, and hydraulic power supply.

(3) **The Pulcrometer.**—Two chambers, $A$ and $B$, converge above and communicate with a single steam-pipe; a ball-valve shuts off either $A$ or $B$, but not both at the same time, from the steam. $A$ and $B$ have a discharge outlet and a suction inlet, both these having valves. The whole is filled with water; the steam drives water from, say, $A$, into the discharge-pipe; condensation takes place and the ball-valve is pulled over, so as to shut off the steam from $A$; the steam then acts in $B$ in the same way as it had done in $A$, while in the meantime $A$, where there is a partial vacuum, is being filled with water from the suction-pipe. The two chambers thus act alternately. The whole contrivance can be hung by chains and let down to the required position; and it is greatly in use in contractors' work.

(4) **The Chain-pump.**—This pump is formed of plates called lifts or buckets, fastened, now generally, by their centres, to an endless chain and moving upwards, in a case or 'barrel' which is in places constricted so as just to let the buckets pass. Chain-pumps are noisy and somewhat apt to break down; but they can lift very gritty or muddy material. Dredging-machines (q.v.) with their buckets are a variety of this device.

(5) **Spiral Pumps.**—An Archimedes' Screw (q.v.) is rotated round its axis so as to make water slip up the inclined plane of the screw. They are very economical in power, and they work so regularly that they act as meters.

(6) **Centrifugal Pumps** (figs. 4 and 5).—The water enters by the supply-pipes, $A$, $A$, which lead to the central orifices of the fan, $B$, $B$; it then traverses the passages, $C$, $C$, formed by the vanes and the side covering-plates, $D$, of the fan. The fan is made to rotate from the shaft, $E$. The water acquires a rotatory motion while passing through the passages of the rotating fan; it then enters the whirlpool-chamber, $F$, and is discharged by the pipe, $G$, at the circumference of $F$; and the velocity of rotation of the fan determines the height to which the water will rise in the discharge-pipe. This velocity cannot conveniently be made to exceed a certain limit; hence the utility of centrifugal pumps is practically limited to low lifts; but as they can be made very large they can deal with enormous quantities of water; and they are much used for pumping in docks, canals, marsh and polder draining, land-reclaiming, and the like. As they have no valves they are little liable to become choked. In nearly all modern centrifugal pumps the whirlpool-chamber, $F$, the purpose of which was to reduce the ultimate velocity of onflow and correspondingly to increase the pressure, is dispensed with; and the same end is attained without wasting energy through friction in the vortex, $F$, by shaping the vanes of the fan so as to reduce the velocity. See Cotterill's Applied Mechanics.

(7) **The Jet-pump,** now not much used, is practically a Giffard's Injector (q.v.) worked by water from a height instead of by steam.

(8) **The Persian Wheel.**—An under-shot wheel (mill-wheel in which the water flows under the wheel) in which little buckets are carried by the rim of the wheel so as to pick up water from the stream and deliver it at the top of the wheel.

(9) **Scoop-wheels or slash wheels,* equivalent to breast water-wheels with reversed action; driven by windmills or by steam, they raise water in their buckets and deliver it a few feet higher up; in some cases they have curved blades, and the water is delivered at the centre of the wheel.

See **Pumps and Pumping Machinery,** by Frederick Colyer, C.E. (Lond. 1886); also see Aire-pump.
Pun, the name given to a play upon words that agree or resemble each other in sound but differ in sense, a verbal quibble by means of which an incongruous and therefore ludicrous idea is unexpectedly shot into the ear, as in the answer to the grave question, 'Is life worth living? '-'That depends on the liver.' We find this form of wit in Aristophanes and Cicero, and in old England it was not unknown even in the pulpit. The sermons of Bishop Andrews and the Church History of Bishop Howard were marked by examples of Thomas Fuller abundant in puns of all degrees of goodness and badness; they meet us strangely enough even in the gravest situations in the tragedies of Shakespeare, and there is at least one in Lidell and Scott's Greek Lexicon. Dr. Johnson said that the man who would make a pun would pick a pocket; but this sentence bears too hard upon the best beloved of English writers, Charles Lamb, a hardened punster, not to speak of Sydney Smith, Hook, Hook, the prince of punsters, and Bishop Wilberforce. Boswell, while relating Dr. Johnson's dislike to puns, ventures his own opinion that 'one or two may be admitted among the smaller excellencies of conversation.' But a pun of the best kind has a value infinitely higher than this: there is tenderness as well as wit in Fuller's phrase of the Holy Innocents of Bethlem—'the infancy in the noble army of martyrs.'

See Spectator, No. 61, L. Larcey's Les Joueurs des Mots (1886), and Holmes' Autocrat of the Breakfast Table. The Hon. Hugh Rowley's Puniana (1887) contains many hundreds examples, among them a few good puns.

**Punch**, a beverage introduced into England from India, and so called from being usually made of five (Hindi, punch) ingredients—arrack, tea, sugar, water, and lemon-juice. As now prepared, punch is a drink the basis of which is alcohol of one or more kinds (especially rum), diluted with water, flavoured with lemon or lime-juice and spices, and sweetened with sugar; sometimes other ingredients are added according to taste, especially wine, ale, and tea. 'Rack-punch' takes its name from the rack of punch, the old-fashioned beforehand (of rum and brandy with milk), bottled, and served cold—even iced. Whisky-toddy, made with whisky, hot water, and sugar, is a kind of punch, the name toddy being Hindustani.

**Punch**, with his wife Judy and dog Toby, the chief characters in a popular comic puppet-show, of Holbeineian lineage, is a caricature of Punchinello, for Pulcinello, the clown of Neapolitan comedy. The word is a diminutive from pulcino, 'a young chicken.' The identification with Pontius Pilate, as well as of Judy with the betrayer Judas, is entirely without foundation. Many believe the modern Punch to have originated in a survival of the Maccus, the fool or clown of the ancient Attellian (q.v.), just as the Italian Arlecchino and Brighetta are of their other Oscar characters. But the line of descent is certainly obscure enough, and it is at least not improbable that some trace of the old Ludii Orci, transmitted through the Vice of the mystery plays, may lurk in the modern drama of the hook-nosed luncheonblack punch and his unfortunate wife Judy. The full-grown modern dramas, which can scarcely be looked on as a school of the domestic virtues, is ascribed to an Italian comedian of the name of Silvio Foscarini, about 1590. The exhibition soon found its way into other countries, and was very popular in England during the 17th century. Its popularity seems to have reached its height at the time of Queen Anne, and continued so for many years. See spectator a regular critic of one of the performances. In 1812 Ouseley saw at Tabriz in Persia a Gypsy puppet-show very like our Punch and Judy. See also MARIONETTES.

The performance of Punch, as generally represented, requires the assistance of only two persons—one to carry the theatre and work the figures, the other to bear the box of puppets, blow the trumpet, and sometimes keep up the dialogue with the figures. The characters of the puppets are managed simply by putting the head, hand, and under the dress, making the second finger and thumb serve for the arms, while the forefinger may be used for the head.

**Punch**, or the **LONDON CHARIVARI**, the English comic journal par excellence, is a weekly magazine of wit, humour, and satire in prose and verse, occasionally adorned by sketches, caricatures, and emblematical devices. It draws its materials as freely from the most exalted spheres of foreign politics as from the provincial nursery; and, dealing with every side of life, is not less observant of the follies of Belgaria than of the peculiarities of Whitechapel. Punch gives dancers place to Irish bulls and dry Scotch humour, and does his best to present them in the raciest vermicul. Stern in the exposure of sham and vice, Punch is yet kindly when it makes merry over innocent follies. Usually a censor omnium in the guise of Joe Miller, a genial English Don Quixote who hurry up the convicts, and, when they are hanged, Punch at times weeps with them. Had he not, and, jocos remotis, pays a poetical tribute to the memory of the departed great. The wit and spirit of serial prints was founded in 1841, the first number appearing on the 17th July of that year, and, under the joint editorship of Henry Mayhew and Mark Lemon, soon became a household word, while ere long its satirical cuts and witty rhymes were admitted a power in the land. **Punch** is recognised as an English institution, and in corners of Europe and America an Englishman rarely comes the frequenter of the café may be asked whether the esoteric wit and wisdom of Cockayne. Their contributions to Punch helped to make Douglas Jerrold, Gilbert à Beckett, Tom Hood, Albert Smith, Thackeray, Shirley Brooks, Tom Taylor, and F. C. Burnand famous; as their illustrations did H. K. Browne, D. G. Doyne, Tenniel, John M. S. Maurier, Keene, L. Sambourne, and Furniss. It should be noted that this comic genial paper has done memorable service in purifying the moral standard of current wit in England.

See CHARIVARI, CARICATURE, the articles on the chief contributors to Punch, for a forum of opinion, by Athel Mayhew, rather unduly magnifying Mayhew's power, and The History of Punch, by M. H. Spielmann (1895).

**Punchestown.** a racecourse close to Naas, 20 miles SW. of Dublin, where are held in April the steepleschases of the Kildare Hunt. There are stone monuments near.

**Punctuation** is the art of marking the divisions of a sentence by means of conventional signs — the full stop or period (.), the semicolon (;), the colon (:) the comma (,), the dash (—), mark of exclamation (!), mark of interrogation (?), inverted commas (" "), and brackets ( [ ] ). Broadly speaking, there are two principal systems of punctuation, the grammatical and the legographical. The system most frequently followed in British printing-houses is neither of these, being a set of empirical rules, in which the logical element is almost entirely wanting, the grammatical is present to some extent, but the ruling factor is apparently arbitrary fancy. Commas are too often held in profound contempt, being scattered at random amongst the words as if from a pepper-box. These lawless little adjuncts can be found, in the best-printed books, insinuating themselves between subject and verb in even short sentences. The printing-offices of the United States are to some extent uniform in their practice. The system they follow is much better than those in
PUNJAB

Britain, and is based principally upon grammatical laws. The old-fashioned method of putting in a comma (or break) or change in the grammar would naturally pause to take breath when reading aloud (as at this point of this sentence) has little in reason to commend it. Punctuation is confessedly difficult, partly owing to the vast differences in the style of different writers, and partly owing to the sentence, but not to the grammar. Punctuation, like grammar, is an irregular word-arrangement which in some cases is inevitable. Given a sensible system, practical experience is the best teacher. In theory little more can be done than to lay down a few general maxims for guidance.

In the first place, follow a logical method of sentence subdivision: let the first and foremost aim be to bring out the meaning clearly and unambiguously, in so far as this can be done with the help of stops. Use commas and semicolons sparingly, especially between them; indeed, only where they are absolutely necessary. The sentence should stand on its own feet, not rest upon a long array of comma crutches. It is not as a general rule necessary to set commas to fence or adorn every adverbial clause. Special care is required in conjunction clauses that may have relativistic clauses. If the relative sentence is entirely subordinate to the main sentence, or if it gives additional information, separate it by a comma or commas; if on the other hand it belongs essentially to the structure of the thought expressed by the main sentence, put no comma. For example, in "that man who had an impediment in his speech," written without the comma, the relative clause points out this particular man and distinguishes him from some other or others who have been also spoken of: it follows in fact the form of the article of demonstrative pronoun. In the same sentence printed with the comma, "the man, who had &c., the relative clause gives an entirely new piece of information, and is no longer demonstrative. The colon is generally put before a long quotation. It would be well to confine the use of it and to one other case—namely, to part a general statement from the immediately following particular application of it or exemplification of it in detail. As for dashes, it is difficult to summarise the rules for their use. They are commonly employed to indicate a sudden break or change in the structure of the logical development of the sentence, as well as to put ironical emphasis upon a word or words thrown to the end of the sentence, as in Heine's phrase, 'Göttingen is noted for its probable home,' suggestions of a tentative nature, or, as in Robert Southey's "The Cottagers," "Nor in the country, nor in the town, nor in the world." The mark of this trogue is generally better without such a clumsy advertisement of the humour. A dash may precede an enumeration of mere names or dates or objects expressed in very brief terms. One dash may also be put before and one after a short clause that merely explains in other words or makes clearer a statement that has just been made: both dashes, and not one dash and some other stop, should be used, except where the second would fall at the end of a sentence. But for this purpose, especially where the parenthetical nature of the added explanatory clause is more pronounced, we are more frequently employed. Semicolons are most appropriately used in compound sentences or sentences that embrace antithetical statements. In the former case of sentence they should mark off the subordinate sentences from the main sentence, and from one another; in the latter case they should separate the antithetical sentences, which generally begin with 'but' or some equivalent. The mark of exclamation has another besides its legitimate use: it is frequently put after absurd or highly improbable statements. The mark of interrogation too has a secondary use: placed in brackets immediately after a word it throws doubt upon its correctness, either as according with fact or as being philosophically to be desired. It is, however, impossible to lay down any general rule. Of course these are only general rules. Many exceptions even to them must necessarily occur. The golden rules in all cases of doubt are two: (1) let logic or, better, common sense be the supreme guide; (2) punctuate so as to bring out the sense best. It is always best for the beginner that British printing-houses would come to some agreement as to a uniform and systematic method of punctuation. See H. Beadnell's Spelling and Punctuation (4th ed. 1891).

Pundit (Hindi, pandit; Skt. pandita, a learned man), in India, a teacher, especially a Brahman, or a Sanskrit scholar. The chief images of India, law, and religion. Of late native pundits have done good service as geographical explorers in districts, such as Tibet, not accessible to Europeans.

Punjab, a river of Portuguese East Africa, forming the principal waterway of Mabonal and Mashonaland; its mouth is situated some 23 miles NE. of Sofala and 130 SW. of the Zambezi delta. After some diplomatic difficulties between Britain and Portugal, it was agreed (1891) by Portugal that British commerce should have unimpeded access by rail or by boat to the interior; under this arrangement, the Pungwe was being made freely navigable for British vessels. In 1894 nearly 200 miles of the railway to the interior had been laid. See Beira.

Punic Wars. See Carthage.

Punishment will be found described in the articles in this work on Criminal Law, Imprisonment, Prisons (p. 429), Flogging, Execution, Pillory, &c. See also the description of Tortures, Book, Guillotine, Thumb-screw, Branks, Jourgs, Ducking-stool, Stocks, &c.; the articles on the several crimes; and W. Andrews, Old-time Punishments (1891). The question of future punishment is treated in the article HELL.

Punjab, or Panjab (pāndj-āb, 'five rivers,' the Pentapontion of the Greeks), a separate province of India, occupying the north-west corner, is watered by the Indus and its five great affluentsthe Jhelum, Chenab, Ravi, Beas, and Sutlej. It is bounded on the W. by Afghanistan, on the N. by Cashmere, on the S. by Sind, and on the E. by the North-western Provinces, and on the S. by Rajputana and Sind. The area under direct British administration is 106,632 sq. m.; that of the native states, thirty-four in number, under British suzerainty (1891) 18,457 in British province and 3,861,883 in the independent states; (1891) 20,803,000 in British territory and 4,256,670 in the feudatory states. The capital is Lahore, but both Delhi (formerly in North-western Provinces) and Amritsar (the religious capital of the Sikhs) are larger. The whole of the northern parts are traversed by spurs from the Himalayas, which enclose deep valleys. On the west the Salt Range mountains run parallel to the Indus. In the south the surface is not broken by any important eminence, except the Salt Range, varying from 2000 to 3000 feet high, between the Indus and the Jhelum. The country, divided into six doabs, or interfluvial tracts, and frequently spoken of as the plains of the Indus, has a general slope towards the south-west. The climate in the plains is mild and dry in summer, reaching in May 87°-4 to 116°-6 F. in the shade at several stations; but is cool, and sometimes frosty, in winter. Little rain falls except in the districts along the base of the Himalayas. The soil varies from stiff clay and loam to sand; but, in general, is sandy and barren, intermixed with fertile spots. Rivers and canals afford ample means of irrigation.
The indigenous vegetation is meagre. Trees are few in number and small, and fuel is so scarce that cow-dung is much used in its stead. Wheat of excellent quality is produced in considerable quantities, as Amritsar, Lahore, Multan, &c. Punjaub exports indigo, grain, salt, metals, spices, tea, tobacco, manufactured cottons, hides, and leather to Kabul, Cashmere, Turkestan, and Tibet; and imports dyes, goats' wool, raw silk, fruits, ghee, horses, fur, timber, and shawl cloth. The total value of the trade is £2,999,000. The inhabitants are of various races, chiefly Sikhs, Jats, Rajputs, and Pathans. Of the whole population, nearly 56 per cent. are Mohammedans; Hindus constitute nearly 38 per cent.; and Sikhs 6 per cent. The Jats are the most prominent race, and are said to have formed the 'core and nucleus' of the Sikh nation and military force. For the history of the Punjab, see Sikhs.

Punkah, a gigantic fan for ventilating apartments, used in India and tropical climates. It consists of a light frame of wood, covered with calico, from which a short curtain depends, and is suspended from the ceiling; another rope from it passes over a pulley in the wall to a servant stationed without; the servant pulls the punkah backwards and forwards, maintaining a constant current of air in the chamber.

Punjo. See PERU, pp. 79-80.

Punt, a heavy, oblong, flat-bottomed boat, used in the Nile where stability and not speed is needed. Punts are also used for fishing and wild-fowling. Some are fitted for oars; but the more usual mode of propulsion is by poles operating on the bottom.

Punta Arenas, (1) the chief port of Costa Rica on the Pacific, stands on a 'sandy point' jutting into the Gulf of Nicoya, and is connected by railway with Esparza, 14 miles east-north-east. The city has a coffee market, and after that indiarubber, hides, dye-woods, and tobacco. Pop. 8000. — (2) A town in Patagonia (q.v.).

Pupa (Lat., 'a doll'), the stage which intervenes between the larva and the adult in the life of insects with complete metamorphosis. Chrysalis, aurocles, nymphs are almost synonymous terms, but pupa is more general and is sometimes applied to stages of the incomplete metamorphosis of other animals besides Insects (q.v.).

Pupil. See INFANT, and EYE, Vol. IV. p. 507; for Pupil-teachers, see EDUCATION.

Puppet. See Marionettes.

Purana (Sansk., 'old') is the name of that class of religious works which, besides the Tantras (q.v.), is the main foundation of the actual popular creed of the Brahmans Hindus (see INDIA, Vol. VI. p. 166). According to the popular belief, these works were compiled by Vyasa, the supposed arranger of the Vedas (q.v.), and the author of the Mahābhārata (q.v.), and possess an antiquity far beyond the reach of historical computation. A critical investigation, however, of the contents of these ancient works bearing that name must necessarily lead to the conclusion that in form they not only do not belong to a remote age, but can barely claim an antiquity of a thousand years, though they contain materials much more ancient. Cosmogonic and theologian doctrines, epic stories, legendary lore, and miscellaneous and encyclopedic matter constitute their contents. They all recognise the Hindu trinity, but are of sectarian tendency; the claims of one god or one holy place being in the various books or parts of them insisted on as worthy of special, if not exclusive, reverence. The Purānas are usually said to be eighteen in number (with a subordinate Upanisadic Purāna which is often classed with each); and they are divided into three groups of six. The first two are devoted to Vishnu and to Siva; the third, which should have fallen to Brahma, is mainly devoted to the several forms of Vishnu, Krishna, Deva, Ganasa, and Surya. They are written in epic couplets, and the eighteen chief Purānas are calculated to contain 400,000 couplets.

See VISHNU, SANSEERIT LITERATURE; Dr John Muir's Samarcid Texts (1858-71); the Vishnu Purana trans. by H. H. Wilson (1849; 2d ed. by Fitzwardell Hall, 1894-97); the Indiscript and Divine, by Dr Burnouf and Hauvette-Bessault (4 vols. Paris, 1840-84), and, with a Sanskrit commentary, by Shriddhar Pandit (3 vols. Bombay, 1887); the Markandeys and Agni Puranas, in the Bibliotheca Indica, by Bazarin and Rajendralal Mitra.

Purbeck, Isle of, a peninsular district of Dorsetshire, 12 miles long and 5 to 9 broad, is bounded N. by the river Frome and Poole Harbour, E. and S. by the English Channel, and W. by the Isle of Purbeck, which is connected with the mainland by the bridge of Lackford Lake, which runs from Lulworth Park to the Frome. The coast is bold and precipitous, with St. Albans Head, 360 feet high; inland a range of chalk downs curves east and west, attaining a maximum height of 655 feet. The geology of the 'isle' is very interesting. The Purbeck Beds are a group of strata forming the upper members of the Jurassic System (q.v.); the Purbeck Marble, belonging to the upper section of these, is an impure fresh-water limestone, composed wholly of the shells of Paludina cavernosa (see DIORITE-BEDS). Nearly a hundred varieties are known, and the largest is a curious kind of trades' guild. Of old the 'isle' was a royal deer-forest. Swanage and Corfe Castle are the chief places.

See Robinson's A Royal Warren, or Rambles in the Isle of Purbeck (1862), and J. Bray's Swannage (1890).

Purcell, Henry, the most eminent of English musicians, was born at Westminster in 1658, and was son of William and Anne Purcell, who was organist of the Chapel Royal appointed at the Restoration. He lost his father at the age of six, and was indentured for his musical training to Cooke, Humfrey, and Dr Blow. His compositions at a very early age gave evidence of talent. In 1680 he was chosen to succeed Dr Christopher Gibbons as organist of Westminster Abbey; and in 1682 he was made organist of the Chapel Royal. He wrote numerous anthems and other compositions for the church, which were eagerly sought after for the use of the various cathedrals, and have retained their place to the present day. Purcell's dramatic and chamber compositions are even more remarkable. Among the former may be mentioned his opera Diado and Aeneas, written at the age of seventeen, his music to the Tempest, his songs in Dryden's King Arthur, his music to Howard's and Dryden's Indian Queen, to D'Urfeys Don Quixote, &c. A great many of his cantatas, odes, glee, catches, and rondos are yet familiar to lovers of vocal music. In 1683 he composed twelve sonatas for two violins and a bass. Purcell studied the Italian masters deeply, and often made reference to his obligations to them. An originality and vigor in the expression of harmony and variety of expression, he far surpassed both his predecessors and his contemporaries. His style foreshadows that of Handel. His church music was collected and edited from the original MSS. by Vincent Novello, in a folio work which appeared in 1869, as well as rich and abundant in his life and works. A complete edition of his
works, many of which are still in MS., was undertaken by the Purcell Society, instituted in 1876. He was buried in Westminster Abbey in 1695, and was

Purchas, Samuel, was born at Thaxted in Essex in 1577, and educated at St John's College, Cambridge. He was presented by the king in 1604 to the vicarage of Eastwood, which he soon resigned to his brother, as the chosen labour of his life resided in the City of London. Later he became rector of St Martin's, Ludgate, and chaplain to Archbishop Abbot, and died in September 1626, if not in a debtor's cell, yet in difficulties. His great works were Purchas His Pilgrimage; or, Relations of the World and the Religions observed in all ages (4 vols. folio, 1610); and, Galatians, and Ephesians Posthumous, or Purchas his Pilgrimes: containing a History of the World, in Sea Voyages and Land Travels by Englishmen and others (4 vols. folio, 1632). The fourth edition of the former usually accompanies the latter as if a fifth volume, although a quite different book is often referred to in other works as "the Purchas". This book holds much resemblance in name, nature, and feature, yet differ in both the object and the subject. This (the Pilgrimage) being mine own in matter, though borrowed in form and method; whereas my Pilgrimes are the acts of others, acting their own parts in their own words, only furnished by me with such necessaries as that stage further required, and ordered according to my rules. Another work is Purchas his Pilgrimes: Micromegas, or the History of Man; relating the wonders of his Generation, varieties in his Degeneration, and necessity of his Regeneration (1619).

Purchas, Samuel, was born at Thaxted in Essex in 1577, and educated at St John's College, Cambridge. He was presented by the king in 1604 to the vicarage of Eastwood, which he soon resigned to his brother, as the chosen labour of his life resided in the City of London. Later he became rector of St Martin's, Ludgate, and chaplain to Archbishop Abbot, and died in September 1626, if not in a debtor's cell, yet in difficulties. His great works were Purchas His Pilgrimage; or, Relations of the World and the Religions observed in all ages (4 vols. folio, 1610); and, Galatians, and Ephesians Posthumous, or Purchas his Pilgrimes: containing a History of the World, in Sea Voyages and Land Travels by Englishmen and others (4 vols. folio, 1632). The fourth edition of the former usually accompanies the latter as if a fifth volume, although a quite different book is often referred to in other works as "the Purchas". This book holds much resemblance in name, nature, and feature, yet differ in both the object and the subject. This (the Pilgrimage) being mine own in matter, though borrowed in form and method; whereas my Pilgrimes are the acts of others, acting their own parts in their own words, only furnished by me with such necessaries as that stage further required, and ordered according to my rules. Another work is Purchas his Pilgrimes: Micromegas, or the History of Man; relating the wonders of his Generation, varieties in his Degeneration, and necessity of his Regeneration (1619).

Purification. See ORDEAL.

Purgativeness. See APERIENTS, CONSTITUTION.

Purgatory (Lat. purgatorium, from purgo, 'I cleanse') is the name given to a place of purgation, in which, according to the Roman Catholic and Orthodox Churches, after death either are puri- fied from venial sins (pecuta venalitatis) or undergo the temporal punishment which, after the guilt of mortal sin (pecuta mortalitatis) has been remitted, still remains to be endured by the sinner (see ABNOMENT). The ultimate eternal happiness of the saints and just men is to be secured, to the belief obtained for a time in a state of purgation, in order to be fitted to appear in that Presence into which nothing imperfect can enter. Catholics hold as articles of their faith (1) that there is a purgatory in the sense explained above, and (2) that the souls there detained are under the disposition and action of the faithful and from the sacrifices of the mass. The scriptural grounds alleged by them in support of this view are 2 Macc. xii. 43-46, Matt. xii. 32, Luke, xii. 48, 1 Cor. iii. 11-15, 1 Cor. xv. 25; as well as certain less decisive indications contained in the language of some of the Psalms. And in all these passages they argue not alone from the words themselves, but from the interpretation of them by the Fathers. The direct testimonies cited by Catholic writers from the Fathers are very numerous; the chief amongst them, however, are the letters of St Paul to the Romans and to the Ephesians, written to the laity, among which the Latins Augustine being one of the most important (though at times he speaks doubtfully); in Gregory the Great the doctrine is found in all the fulness of its modern detail. The epi- taphs of the catecombs, too, supply Catholic contrac- tualists with some testimony to the belief of a purgatory, and of the value of the intercessory prayers of the living in obtaining not merely repose, but relief from suffering, for the deceased; and the liturgies of the various rites are still more decisive arguments in this direction. Beyond these two points Catholic faith, as defined by the Council of Trent, does not go; and the council expressly prohibits the popular discussion of the 'more difficult and subtle questions, and everything that tends to curiosity, or superstition, or savours of filthy lucre.' As to the substance of the doctrine, purgatory and Greek and Latin churches are agreed; and they are further agreed that it is a place of suffering; but, while the Latins commonly hold that this suffering is 'by fire,' the Greeks do not determine the manner of the suffering, but are content to regard it as that which is due to the unfruitful works of their ultimate salvation; and whether a particular judgment is passed on every one immediately after death. For Patrick's Purgatory, see DEGO (LOUGH). The medieval doctrine and practice regarding purgatory may be divided into the periods of the early and the later Middle Ages. After the sixteenth century, the protest of the Waldenses and other sects of that age. The Reformers as a body rejected the doctrine. Protestants generally refer to the arguments of Roman Catholics on the subject of purgatory by refusing to admit the authority of tradition or the testimonies of the Fathers, and at the same time by alleging that most of the passages quoted from the Fathers, as in favour of purgatory, are insufficient to prove that they held any such doctrine as that now held by the Roman Catholic Church. Some of them, however, relating only to the subject of prayer for the dead (see PRAYER), and others to the doctrine of Limbus (q.v.). That the doctrine of purgatory is the fair development of that which maintains that prayer ought to be made for the dead; Protestants gener- ally acknowledge. As to the alleged evidences from Scripture, they are commonly set aside by Protestants as irrelevant or wholly insufficient to support such an inference. The doctrine of purgatory in its historical connection with other ecclesial- logical doctrines is touched on in the article HELL.

Purification of the Blessed Virgin Mary, Feast of, a festival in commemoration of the 'purification' of the Blessed Virgin Mary, in accordance with the ceremonial law of Lev. xii. 2. This ceremony was appointed for the fortieth day after childbirth, which, reckoning from December 25 (the anniversary of a certain nativity in the year upon which the Purification of the Blessed Virgin Mary was celebrated). The history of Mary's compliance with the law is related in Luke, ii. 22-24. The date of the introduction of this festival is un- certain. The first trace of it is about the middle of the 5th century, and in the Church of Jerusalem. In the Western Church it was known to Beza. Its introduction in the Roman Church in 494 was made by Pope Gelasius on the occasion of transferring to a Christian use the festivities which at that season were among the leading phases of the Lupercalia. See CHURCHING OF WOMEN.

Purim, a Jewish secular rather than religious feast, in honour of the deliverance of the nation, recorded in the Book of Esther, held on 14th to 15th Adar. Apparently it spread but slowly; still Josephus tells us that by his time it was observed over all the Jewish world. Most modern scholars
Puritans, a name first given, according to Fuller, to a body of churchmen in England who in 1612 were opposed to those clergymen of the Church of England who refused to conform to its liturgy, ceremonies, and discipline as arranged by Archbishop Parker and his coadjutors. The history of Puritanism within the church is sketched at England (Church of), Vol. IV. p. 512. In the church, repressive measures, the principles of the party amongst the clergy who believed that the church did not separate itself markedly enough from Roman Catholicism and needed further reformation gradually spread among the serious portion of the laity, who were also called Puritans. But the name appears not to have been confined to those who wished for certain radical changes in the forms of the church. The character that generally accompanied this wish led naturally enough to a wider use of the term; hence, according to Sylvestre, 'the obvious mutine of the bulky body called all Puritans that were strict and serious in a holy life they were ever so conformable.' This is the sense in which the Elizabethan dramatists use the word From this very breadth of usage one sees that there was really no fixed idea of Puritanism. Some would have been content with a moderate reform in the rites, discipline, and liturgy of the church; others (like Cartwright of Cambridge) wished to abolish Episcopacy altogether, and to substitute Presbyterianism; while a third party, the Brownists or Independents, were out-and-out dissenters, opposed alike to Presbyterianism and Episcopacy During the reigns of James I. and Charles I. the spirit of Puritanism continued more and more to flourish in the English church and society, and the English Parliament, although the most violent efforts were made by both monarchs to check it, never succeeded in putting down the spirit of the churchmen of the Synod of Dort (1618-19) both the Puritans and their opponents in the church had been substantially Calvinist; the strong tendency towards Arminianism amongst churchmen raised a new ground of controversy between the Puritans and the more extreme party of the Lord Treasurer of the Netherlands and the Catholics. The policy of Land and the outrages practised by Charles I in the English constitution led many who were not all Genevan in their ideas to oppose both church and king for the sake of the national liberties. In the member of Westminster, Assembly of Divines (1643) the great majority of the ministers were Presbyterians. But the more advanced Puritans, who were predominant in the army and the parliament, ultimately triumphed in the person of Cromwell (q. v.). The Restoration (1660) brought back Episcopacy, and the Act of Uniformity (1662) threw the Puritans of the church into the position of dissenters Their subsequent history is treated under the different forms of dissent. Before the Civil War broke out so great were the hardships to which the Puritans were exposed that many of them emigrated to America, to seek liberty and peace on the solitary shores of the New World. There they became the founders of the New England states, and cultivated unmolested that form of Christianity to which they were attached. Notwithstanding the spirit of Puritanism in its evil as well as its good, they were thoroughly American in spirit than in Massachusetts. In Scotland Puritanism dates rather from the 'Second Reformation' of 1638 than from the original establishment of Presbyterianism after the Reformation.

See Neil's History of the Puritans (ed. by Tomlin, 5 vols. 1822); the histories by Stowell (1814); new ed. 1878) and Marsden (1850); Bacon, The Genesis of the New England Churches (New York, 1874); Ellis, Puritan Age in Massachusetts (Boston, 1883); the works cited at S. R. Gardner, with his Constitutional Documents of Puritan Revolution (1890); the articles in this work on Interdependent Church, Presby- terianism, Westminster Assembly, Putten, Mar- prelate, Hampton Court, Smectymnuus; on Eliza- beth, James I., Charles L, Cromwell, Milton; on Land, Puritans, Reformation, Menander, on Puritans How, Baxter, Owen. In Nield's edition of the Puritan divines (20 vols. 1861 et seq.) other names included are those of Manton, Adams, Goodwin, and Jackson.

Purkinje's Figure, named after the physiologist J. F. Purkinje (1797-1869), a professor at Breslau and at Prague; see EYE, Vol. IV. p. 512.
Purl, a beverage made by warming a pint of ale with a quarter of a pint of milk, and adding sugar and a wine-glassful of gin, rum, or brandy.
Purley. See Tooke (Horncp).
Purmencrd, a town of North Holland, 10 miles N. of Amsterdam; pop. 4980.
Purunth, a town of British India, in the presi- dency of Bengal, 230 miles N.W. of Calcutta, has a trade in jute. Pop. 16,500.

Purple Colours. Painters in oil and water colours prepare various shades of purple by mixing certain red and blue pigments, or by taking an oil French ultramarine, often called French blue, is mixed with vermilion or some madder red (madder carmine is best), or one of these reds with cobalt blue if a pale purple is wanted. For permanent purples in water colours the same blues are used; but one of the madder reds, or vermilion, should be mixed with them. A much richer purple than any of the above mixtures will give is produced by Prussian blue and one of the lakes from cochineal—viz. carmine or crimson lake—but it is not permanent, and this purple, as well as that obtained by mixing Indian red with indigo, also fugitive, was much used by water-colour painters in past years. Purple madder is the only simple purple pigment available for the artist who is durable, and it is unfortunately costly. All purples are changed to neutral and grey tints by the addition of any yellow pigment. For house-painting moroou lake with a little French blue gives a useful purple; but some of the above mixtures also are occasionally used.

There are several ways of dyeing textile fabrics of a purple or closely similar colour. The most ancient dyes was the Tyrian purple, which is said to have been discovered at Tyre many centuries before the Christian era. Among the Romans this colour was exclusively employed for dyeing the imperial robe. It was obtained from shellfish belonging to the genera Marua, Parpura, and Rucenmum; at least it has been supposed that it was prepared from one or more species of these. The colour was so costly that in the time of Augustus one pound of it sold for what would amount to £36 sterling. About the year 1651 what is believed to be the same or a closely similar purple was obtained from uric acid by a peculiar treatment (see MUREX; Dying, Vol. IV. p. 139; and PHENICIA). Archil (q.v.) seems to have been the only simple purple dye known in the middle ages. Purple of Caisius is a compound of gold and tin used in enamelling (q.v.). For oil-borders (q.v.) the Tyrian purple was used in manuscript painting. It was discovered at Leyden by Andrew Cassius about 1883. A preparation of this colour was formerly used for painting miniatures in water-colour; but for this purpose purple madder, being cheaper, has taken its place.

Purple Emperor (Apatura iris), one of the largest of British butterflies, and one of the most richly coloured. The span of wings is from 2½ to 3½ inches. The wings are strong and thick, and
the flight is very vigorous. The male flies especially high, and will perch on lofty trees. The exterior larva is green and feeds on sallow.

**Purpura.** See Wheat.

**Purplc Wodd, or Purplc Heart.** The heartwood of *Copaeira publis flora* and *C. bracteata,* a very handsome wood of a rich plum colour. The trees producing it are natives of British Guiana, and its chief use in England has been for making ranforps for guns.

**Purpura,** a genus of marine Gasteropode, from some species of which (e.g. *P. petulata,* as well as from *Murex,* the famous Tyrian purple dye was derived. *P. lapillus* (the Dog Whelk) is common on most British coasts, and from it also the dye is procurable. See WHELK.

**Purpura,** or The Purpures, is a malady which is often erroneously placed amongst the diseases of the skin. It is in reality a blood disease, and is characterised by the appearance of small round spots, of a deep purple colour, which are seen first and most abundantly on the legs, afterwards extend to the arms and trunk. They are accompanied by no local pain, are not effaced by pressure (being due to a drop of blood extravasated beneath the cuticle or in the structure of the skin itself), do not rise above the surrounding surface, and are sometimes determined with livid patches resembling bruises; and, before disappearing, both the round spots and the patches undergo the same change of colour which a bruise undergoes. These spots are not peculiar to the skin, but occasionally occur upon internal surfaces and in the tissues of the viscera. Passive haemorrhages from the mucous membranes frequently accompany the external symptoms. There is usually much debility, and often a great tendency to faintness. The duration of the disease varies from a few days to a year or more. Slight cases are devoid of danger, and even the hemorrhagic cases usually recover, unless the bleeding has been excessive or the blood has been extravasated into a vital organ.

Precisely similar appearances occur in the course of other diseases, especially scarlet fever, scarlet fever, and smallpox. But the name purpura should be restricted to the cases in which no such disease is discoverable.

The causes of purpura are obscure. The treatment which succeeds best varies in different cases, but the main indication always is to correct the condition of the blood.Arsenic, mercurial, sulphuric, and nitric acetate of lead, gallic acid are the drugs which are generally most beneficial; rest in bed, light diet, and laxatives are desirable at the commencement. When there is reason to believe that the disease is dependent upon depressing influences a nutritious diet, tonics, and stimulants are required; but chalybeates should be avoided. If the hemorrhage proceeds from accessible parts, local measures, such as the employment of ice or strong astringents, should also be had recourse to.

**Purser,** the name formerly given to the officers in the navy who had the charge and issue of the provisions, slops, soap, tobacco, &c., and who also kept the ship's books; the title was one of the oldest in the service, but the holders of it for long only ranked as warrant-officers, and their duties and responsibilities were in many respects very ill-defined. In the old war-days they were looked upon with great dislike by the seamen, as they were credited with enriching themselves at the expense of the men, and unreasonably the opportunities for sharp practice in their department were considerable, as also for making money by methods which were not always legitimate; much of this, however, was due to the laxity of the system of victualling and of keeping the ship's accounts in those days. In 1844 this branch of the service was completely reorganised, paymaster being substituted for the title purser; and the officers composing it are now drawn from a much higher class than formerly, coming generally from the same station in life as the combatant officers. See PAYMSTERS.

**Purslane** (Portulaca), a genus of plants of the natural order Portulacaceae, having a thick calyx, four or six petals, eight or sixteen stamens, and a capsule dividing around the middle. Common Purslane (*P. oleracea*) grows in cultivated and waste grounds on the seashore in almost all tropical and subtropical parts of the world. It is cultivated as a pot-herb. It is a short-lived annual, with spreading and rather procumbent stems, and ovate fleshy leaves, which, as well as the young shoots, are frequently used in salads. The young and tender shoots are pickled in France like gherkins. Purslane is not so common in British gardens as it once was. Some species of Portulaca, such as *P. grandiflora,* of which there are several brilliant varieties, and *P. gilliesii,* are choice half-hardy annuals occasionally cultivated in British gardens. They are reared in hotbeds in spring and planted out in the flower-garden in the end of May, or they are grown in pots exclusively for the purpose of decorating the greenhouse.

**Pursuivant.** See HERALD.

**Pus** is a well-known product of inflammation, and occurs as a thick yellow creamy fluid, differing from all other morbid exudations in containing a large number of corpuscles, having a soft and fatty feeling when rubbed between the fingers, a peculiar colour, usually an alkaline reaction, and a specific gravity of about 1·032. Like the blood, it consists of certain definite microscopic elements, and of an intercellular fluid or serum in which they swim.

Of microscopic structure (1) the leucocorpuscles, which, both in their chemical and physiological relations, seem to be identical with the lymph-corpuscles, or colourless blood-cells; in diameter they range from 0·004 to 0·005 of a line, and each corpuscle consists of a cell-wall, which often appears granular, of viscid transparent contents, and of one or more nuclei, which can be rendered much more apparent by the addition of acetic acid. The other elements are (2) molecular granules and (3) fat-globules. The serum of pus is perfectly clear, of a slightly yellow colour, closely resembling the blood-serum, and coagulates on heating into a thick white mass.

The chemical constituents of pus are water (varying from 769 to 907 in 1000 parts), albumen (from 44 to 180), fats (from 9 to 25), extractive matter (from 19 to 29), and inorganic salts (from 5 to 13), in addition to which mucin, pyroglutelin, urea, &c. are occasionally present. Of the inorganic or mineral constituents the soluble salts are to the insoluble in the ratio of 8 to 1, and the chloride of sodium (the chief of the soluble salts) is three times as abundant as the serum of the blood. The mode of formation of pus is described in the article SUPPURATION.

**Pusey, Edward Bouverie,** was born in the year 1800 at Pusey in Berkshire. He was descended from a family of Flemish refugees; his father was
the youngest son of the first Viscount Folkestone, and had assumed the name of Pusey when the estates in Berkshire were bequeathed to him by his father. He was educated at Eton and Christ Church, Oxford, and was elected a Fellow of Oriel College in 1823. As soon as he had completed his studies at Oxford he passed to Germany, partly to study German, which was in the Oxford of those days practically an essential element in the preparation to Holy Eucharist languages, and partly to become acquainted with the latest forms of German theological teaching. In 1827 he returned to England, and in the following year the Duke of Wellington appointed him regius professor of Hebrew in Oxford University, a position which he retained until his death. Although his fame in other respects has caused his Hebrew lecturing to be forgotten, he laboured most unwearily in the duties of his chair, and attracted a great number of pupils. His first work was an essay in which he sketched the causes that contributed to the Rationalistic character of recent German theology. He acknowledges his indebtedness to Professor Tholuck for some portions of this essay, but the elaborate proof of his position was his own work executed with characteristic thoroughness. It was several years before the English church felt entirely the direction of the Rationalistic teaching with which it dealt; the charge was greatly exaggerated, besides being caused in part by vagueness of expression throughout the volume. His main position was unassailable; German Rationalism he maintained was the consequence of the spiritual declension of the orthodox Lutheran church. He was misunderstood as if he had attacked the creed of the Lutherans in its orthodox portions; as a matter of fact he only wished to attribute Rationalism to the want of life in the Lutheran body. But many of his statements were in later years very unsatisfactory to himself, and he withdrew the work from circulation. The whole aim of his life was to prevent the spread in England of Rationalism such as that with which he had become familiar in Germany. Hence, when in 1833 John Henry Newman with the same object began the issue of the Tracts for the Times, Pusey very soon joined him, and they, with Keble, were the leaders of this eventful effort. Their object was not to attack the statements of Rationalistic teachers; there was as yet no call for that in England; but they desired to stir up in the Church a spiritual life and power which would be of itself the best preservative against the infection of the Rationalistic spirit. For this purpose they attempted not to reform, but to restore; they appealed to the idea of the church, to its divine institution, to its services, to its sacraments, to its formulas of faith, to its history, and to the examples of the holiest lives in former generations. They endeavoured to make the church live again before the eyes and minds of men as it had lived in times past. In this connection Pusey wrote his contributions to the Tracts for the Times, especially on the Spiritual Life, and on the Eucharist. His sermons also were vigorous appeals to live the Christian life, and careful expositions of the doctrines which the church from the first had taught. With a similar purpose also in 1836 he commenced the Tracts for the Times, on the genuine writings of the ancient fathers of the Christian church. Under the title of the Oxford Library of the Fathers, Dr Pusey's chief contributions to it were a translation of St Augustine's Confessions and of several of the works of Tertullian. The result of these efforts—to which, with others, he contributed his share—was the establishment of Pusey's name as one of the chief figures in the Oxford Movement. Pusey entirely devoted himself—was most conspicuous, and extended far beyond the ranks of those who were called by their opponents either Newmans or Puseytizes. But the work was checked by the action of the authorities at Oxford. First Newman's celebrated Tract 90 was condemned in 1841, and in 1843 Pusey was suspended for three years from his professorship. The occasion of this suspension was a sermon on the Holy Eucharist which he preached before the University, and which a board of six doctors of divinity, without allowing Pusey a hearing, or specifying the points on which he was supposed to have transgressed the laws of the University, condemned as contrary to the teaching of the Church of England. As soon as an opportunity offered Pusey reiterated his teaching, and this time he was un molested. But before his suspension was over Newman had joined the Roman Catholic Church, and this event left Pusey without any of his leading disciples. All ranks were divided into certainty of Pusey soon following; but those who knew him best were assured that never for one moment did he entertain any thought of leaving the Church of England. With Keble he at once set himself to reassure those who were reeling under the blow of Newman's departure; and it was mainly the moral weight of Pusey's work and character which prevented the powerful efforts of Newman between 1833 and 1841 from resulting in a catastrophe greater than any which the English church had suffered. The continuance of unfailing loyalty to the church and deep conviction of God's presence with it, his buoyant hopefulness even in the darkest days, and his great patience cheered and settled many anxions hearts, and stopped others who were on the point of following Newman. His attitude would have had a yet wider result, except for the sad events which followed in rapid succession in the ten years subsequent to Newman's secession. The new power which a civil court had acquired over doctrinal suits—which was exhibited in the judgment in the Gothic case—the constant anxiety of bishops, and others upon the Oxford movement, the practical inhibition of Pusey from all ministerial work in the diocese of Oxford by Bishop Wilberforce, whereby it was made to appear that the church disowned his teaching—these and other less important but significant events caused the departure of the Roman Church of another band of distinguished men, including Archdeacon (Cardinal) Manning and Archdeacon Wilberforce. But still Pusey laboured on, carefully defining the exact position of the English Church, as against Roman claims on the one hand, and against Zwinglianism and Erastianism on the other.

Only the chief of his numerous writings during this period can be alluded to. They included a lengthy letter on the practice of confession, The Church of England leaves her children; free to whom to open their griefs (1850), a treatise the form of which makes it appear to belong to a moment of controversy, although the matter is really of permanent value; a general defence of his own position in A Letter to a Londoner in 1851; a work on The Royal Supremacy under Henry VIII, and an account of the Oxford Eucharistic Controversy, and of the Church of which Kings are members, in 1850; a larger book on The Doctrine of the Real Presence, as contained in the Fathers (1851), and as taught in the Church of England (1857). In this class of writings may be included also Dr Pusey's Eirenicon (1869, iii. in 1870). The object of these volumes was to clear the way for reunion between the Church of England and the Church of Rome on the basis of Catholic, as distinct from Roman Catholic, doctrine and practice. The work was undertaken at the University, which was undertaken after the report of the first Royal Commission on the Universities, and which destroyed for ever the integrity of the originally most intimate bond between the University and
the Church, greatly occupied Pusey's mind. His evidence before the commission, his remarkable pamphlets on the comparative advantages of Collegiate and Parochial Training, and his advice to the Proprietors of Sanchar Schools, his practice of celibacy, and his assistance to the Hebdomedal Council for many years are proofs of the interest that he took in the welfare of his university, and of the importance that he attached to a close connection between education and religion.

Pusey opposed his friend's plan as carefully as he supported it. He disapproved of Pusey's views. The teaching for which the Tractarians had laboured and suffered was at that time beginning to be recognised, and those disciples of the Oxford movement who had survived the shock of the events of the last twenty years were spreading its principles throughout the country. But the fruits of the intolerance and persecution of which Oxford had been the scene were also ripening in the form of the spread of religious indifference, based on Rationalistic views of revelation. This was the enemy which from the first Pusey had dreaded. He had at least the satisfaction of knowing that, as a result of the movement in which he had taken so prominent a part, the inner life of the English Church was far better able to bear the onset of such a foe, and to estimate the moral and spiritual resources which would make it strong, as the Lutheran body of the 18th century, or even the Church of England in 1830. Against such teaching he contended for the rest of his life. All his later sermons before the university and most of his later books deal with it. It was with this purpose that he composed Professor Dowett's pamphlet. He contributed to his statements in his commentary on St. Paul's Epistles, and that he took so prominent a part in the later controversy about the Athanasian Creed. His chief works in this connection are the Lectures on the Book of Daniel, and What is owing to Excessive Punishment? The former, delivered in 1863, vigorously attacked those writers who would assign to the Book of Daniel a date as late as the 2d century B.C. Apart from the marks which the lectures bear of the heated controversy of the time, they are an admirable demonstration of the author's intellectual power, wide reading, and solid learning. The other book is against the denial of everlasting punishment; its sobriety and fullness, the familiarity which it shows with all the issues raised in the controversy, is due to its respect for its character and calm tone make it one of the most remarkable of Pusey's works. Of a kindred character, although in a different field, are the last two university sermons which he wrote—on the relation of science to faith and on the nature of prophecy.

Two other works must be noticed. Pusey inherited from his predecessor in the Hebrew chair the task of completing A Catalogue of the Arabic Manuscripts in the Bodleian Library (1835). It was a great task, and it occupied his time for six years. Pusey's Commentary on the Minor Prophets (1860-77) was his contribution to a commentary on the whole Bible which he had in his mind for many years, and on which he enrolled the labours of Kühle and many others. Pusey himself undertook a part of it, and advancing years, for the claims of other duties prevented the others from contributing their share.

In private life Pusey was a man of warm affection, and widely known for his gentleness, sincerity, and munificence. He seems to have been at ease in early life at first withdrew from it for purposes of study and to save more money to give to the poor, but from the time of his wife's death in 1839 he avoided all social amusements. But he was always accessible to any one who wished his advice on religious questions; in fact, he was constantly sought as a spiritual guide by persons of every station. His charity was bounded only by his income; besides abundant gifts to poor people, he supported by his own money the work of providing churches in East London, in building St. Saviour's, Leeds, and in founding and supporting sisterhoods. His capacity for study and for literary work was immense. He worked only at what it was his duty to study, but within that line he spared neither time nor pains in reaching every detail. His power of keeping his main object before his mind without being confused by its details, and of grouping the details in their due position, can be seen in almost any of his works. Opponents of all schools gave him the credit of being confused; but an occasional confusion in his manner of expressing his thoughts did not prevent him from knowing his own mind with singular clearness. He died on 16th September 1882.

The Life of Pusey by Canon Liddon, left unfinished at his death, was completed by a present writer, the Rev. R. J. Wilson, the Canon's literary executors (5 vols. 1883-99).

Pushkin, Alexander Sergeevich, was born at Moscow, 23rd May 1799, and educated at Tsarskoe Solo. In 1817 he entered the service of the government, but on account of his liberal opinions was for some time transferred to Bessarabia. In 1820 he published his first romantic poem, Rudan and Ljudmila. Next came his Prisoner of the Caucasus (1822), his Fountain of Bakhchisarai (1826), Tartan (The Gypsies, 1827), and Eugene Onegin (1828; Eng. trans. 1881), a clever novel in verse. Meanwhile, his new style began. In 1829 he published Poltava, which has Mazeppa for its hero. About the same time he wrote his fine tragedy Boris Godunov. Besides these works of considerable length, he was the author of many graceful lyrical poems, deservedly popular throughout Russia. He also left some prose writings, consisting of a History of the Revolt of Pugachev (in the reign of Catherine), several tales, and miscellaneous essays. He was appointed Russian historiographer with a pension of 6000 roubles. He was mortally wounded in a duel, and expired at St. Petersburg, January 20 (February 10) 1837. Pushkin is considered the greatest poet whom Russia has yet produced. His writings show versatility, a powerful imagination with vigour of expression. In his Eugene Onegin, a Don Juanesque poem, he is both humorous and pathetic, and many of his smaller pieces display wonderful elegance and finish.

The last named poem was translated into English verse by Spalding (1881); the Daughter of the Commandant was translated in 1891; and a translation of the Poems, with introduction and notes by Ivan Panin, appeared at New York in 1889. Pushkin's name is also spelt Ponshkin and Pouchekin. See the section on the literature under Russia, and works there cited.

Pushin, or Pukhov, the language of the Afghans (see AFGHANISTAN), is, according to Darmester, not intermediate between the Iranian and Indic branches of the Aryan stock, but is directly derived from the Zend, with Persian, Hindustani, and Arabic admixture. See Stropp's Pushto Grammar (1873), Strangford's Letters and Papers (1872), and Darmester's Chants Populaires des Afghans (1890).

Pustule, a circumscribed elevation of the cuticle, containing pus: in fact, a small abscess in the skin. Pustules occur in many skin diseases—eczema, acne, scabies, ophthia, boils, &c.; and very prominently in smallpox. For Malignant Pustule, see ANTHRAX.

Puteaux, a town 2 miles from the western boundary of Paris, on the left bank of the Seine,
opposite to the Bois de Boulogne. Many Parisians have fine villas here. There are manufactures of dyes, dyes and chemicals, dyeing, and calico-printing. Pop. 15,151.

Puteo1. See PozzUOLL.

Putnam, a town of Connecticut, on the Quinnipiac River, 56 miles by rail from New Haven, has manufactures of cottons, boots and shoes, &c. Pop. (1900) 7348, including Putnam city (6667).

Putnam, Israel, a general of the American Revolution, was born in what is now Danvers, Massachusetts, 7th January 1718. In 1739 he bought a farm between Pomfret and Brooklyn, Connecticut, and for many years devoted himself to its cultivation, gaining meanwhile a high reputation for courage by such personal exploits as following a she-wolf into her lair and killing her single-handed. In 1755 he left as a captain in a contingent of 1000 men which Connecticut sent to repel a threatened French invasion of New York, and was present at the battle of Lake George. In 1758 he was captured by the savages, tortured, and then bound to a tree, and was about to be burned to death when a French officer scattered the fire-hounds and rescued him. In 1739 he received a regiment, and in 1746 he went in the dreadful West India campaign which resulted in the capture of Havana, and in 1704 he helped to relieve Detroit, then besieged by Pontiac (q.v.). Ten years of quiet at home succeeded, during which he made his farmhouse into an inn, and was conspicuous among the "Sons of Liberty." In 1773, after Concord, he was given the command of the force of Connecticut, and was ranking officer on the day of Bunker Hill, though not in actual command at either the redoubt or the rail-fence. He was next appointed by congress one of the four major-generals, and held the command at New York, and in August 1776 at Brooklyn Heights, where he was defeated by General Howe on the 27th. He afterwards held various commands, and in 1777 was appointed to the defence of the Highlands of the Hudson. While at Peckskill a lieutenant in a loyalist regiment was captured as a spy and condemned to death; and, on Sir Henry Clinton's sending a flag of truce threatening vengeance if the sentence should be carried out, Putnam wrote a brief and characteristic reply: "Headquarters, 7th August 1777.—Edmund Palmer, an officer in the 19th regiment, was taken as a spy by Hessians within our lines; he has been tried as a spy, condemned as a spy, and shall be executed as a spy, and the flag is ordered to depart immediately.—Israel Putnam.—P.S.—He has accordingly been executed." In 1778, in western Connecticut, Putnam made his famous escape from Governor Tryon's dragoons by riding down the stone steps at Horseneck. The next year he had a stroke of paralysis, and the rest of his life was spent at home. He died 19th May 1790. See Life by Increase Grant (1875), and article by Professor John Finke in Appleton's Cyclopaedia of Amer. Bioy. (1888).

His cousin, Rufus Putnam, born 9th April 1738, served against the French from 1757 to 1759, and then settled as a farmer and millwright. On the outbreak of the war he received a lieutenant-colonel's commission, and returned West. He served as an engineer. In 1778 he helped his cousin to fortify West Point. Afterwards he commanded a regiment till the end of the war, and in 1783 he was promoted to brigadier-general. In 1788 he took part in the Constitution; in 1793 he was appointed a judge of the supreme court of the North-west Territory; and from 1793 to 1803 he was surveyor-general of the United States. He died in Marietta, 1st May 1824.—Israel's grand-nephew, George

Palmer Putnam, born in Brunswick, Maine, 7th February 1814, in 1840 became partner in the book-store of Willey & Putnam, New York, established a branch in London in 1841, and in 1848 returned to the United States and started a new house. In 1852 he founded Putnam's Magazine. In 1863 he retired from business, but in 1866 he established the firm of G. P. Putnam & Sons (now G. P. Putnam's Sons). He died 20th December 1872. He wrote the book compiled several books, and was the author of the first "Plea for International Copyright" (1857) printed in Amerin.

Putney, a suburb of London, in Surrey, 6 miles WSW. of Waterloo, on the south side of the tidal Thames, which, here nearly 300 yards broad, is crossed by a new granite bridge (1854–86), leading to Putnam, and founded and opened by the Prince of Wales. It is a great rowing place, the starting-point of the Oxford and Cambridge boat-races, and from its ready access to Town, the river, Putney Heath, and Wimbledon Common, has grown rapidly of recent years, its principal feature that there are no poor. The parish church, with a 15th-century tower, is in the country of Putney Heath. The Present was mainly rebuilt in 1830; in the churchyard is Toland's grave. Putney is the birthplace of Thomas Cromwell and Gibbon, the residence of Mr Theodore Watts and Mr Swinburne, and the death-place of Pitt and Leigh Hunt. From Putney's old bridge a Mary Wood flew down herself; and on Putney Heath Pitt fought his duel with Tierney (1708), Castlereagh his with Canning (1800). Pop. (1851) 5250; (1881) 13,255; (1891) 17,771.

Putrefaction is the term given to the decomposition of organic substances when accompanied by an offensive chemical change due to the complexity, resulting instability, and affinity for oxygen of organic matter. It is now known to be the result of the living activity of certain minute plants called Bacteria (q.v.), which also cause Fermentation (q.v.) and many diseases (see GERm). The spores of these plants are present in great numbers in the lower levels of the air, in water, and on the surface of the earth; and, as they are only about 0·001 mm. in diameter and two to four times as long, it is not surprising that they were not seen, and that putrefaction was supposed to be spontaneous. But, if we boil an infusion of tar or turpentine in a closed vessel it will remain without any change for years, but will begin to putrefy in a day or two if the plug be removed. A low temperature, although it will not kill the bacteria, will stop their growth and the resulting destructive changes; hence the use of freezing food on shipboard. Salicylic, carabolic, and other acids also check putrefaction, but are now known to be only a few poisons, such as corrosive sublimate, chlorine, and bromine, that actually kill. Drying stops growth and kills the developed plant in a few days, but the spores will live for a long time in a dried condition. The effect of oxygen is different, some species require oxygen to hindered in their growth by it; and a high pressure of oxygen will kill over those kinds that need a certain amount in a few days. Of the precise chemical changes that take place as a result of the life of bacteria we are still largely ignorant; but the chief fact now is that these changes are dependent under Fermentation. For an investigation in the causes of putrefaction, see Tyndall's Floating Matter of the Air (1851).

Putrid Fever. See JAIL FEVER.
PYEMIA

It is a municipal borough, uniting with Carnarvon, &c. to return one member. Pop. of parish, 3222.  

Pyemia (from the Gr. πυς, ‘pus’ and ήaimα, ‘blood’), or purulent infection of the blood, is a disease whose exciting cause is the introduction of decomposing pus or wound discharges, or the products of decomposition of animal fluids, into the circulation, either by an ulcer imperfectly closed (see Pileritis and Perforal Feyer). The term Septicismia is applied by some to the same disease, by others only to very grave cases of pyemia; while by many it is restricted to cases of blood-poisoning by pathic animal matters, which, having failed to decompose, are expelled from decomposing wounds or dead bodies, or borne on foul air or septic gases. The two conditions have a general resemblance to each other. The poison is rapidly absorbed and diffused, and the blood undergoes certain changes, the nature of which chemistry has as yet failed to detect; it is certain, however, that the blood contains micro-organisms (mierococci and bacteria; see Germ). Within twenty-four hours, in very acute cases, there are severe shiverings, headache, and giddiness followed by a loss of consciousness or delirium. In twenty-four hours more the patient may be in a hopeless condition, delirious, and rapidly sinking. In less acute cases the symptoms closely resemble those of typhoid fever, and in this form the disease is a common cause of death after surgical operations. Its most conspicuous character is the formation of secondary abscesses in the lungs, liver, kidneys, and other internal organs, in the various glands (the parotid gland in President Garfield’s case), in the joints, and in the tissues immediately under the skin. The pus of such abscesses always contains bacteria. There is usually more or less delirium. The patient generally dies of exhaustion. Recovery is rare. It is chiefly, however, in the presence of predisposing causes, such as previous illness, prostration from organic disease or surgical complaints, or from difficult parturition, unhealthy occupations, &c., that the poison acts so severely; these, with the occurrence of putrefaction in a wound, may convert a comparatively slight local mischief into infection of the whole mass of the blood.

Bearing in mind that the micro-organism which pyemia originates, it is clear that this disease is one to be prevented rather than cured. Until comparatively recently, when it was acknowledged that pyemia was the cause of death in 10 per cent. of all cases of amputation, the careful preparation of a patient before operation was, with justice, most strenuously insisted on. ‘Patients must be strengthened,’ said Mr Callender, ‘by tonics, such as quinine and iron; and their secretions must be set right by appropriate alteratives; this treatment must be continued for a considerable period.’ Diet should be attended to, and temperate patients should be accustomed to a more healthy mode of life. After operation, also, patients should be adequately supported with nutritious diet, and not with stimulants, mere stimulants. The principal minerals are coal and lead. Hot and cold mineral springs are abundant, among the most frequented being those of Mont Dore (q.v.), Châteauneuf, St Nectaire, Royat, Châteldon, &c. The department is subdivided into the arrondissements of Ambert, Clermont-Ferrand, Insole, Rom, and Thiens. Capital, Clermont-Ferrand.

Puzzle-monkey. See Araucaria.

Puzzola’na. See Cements.

Pwllhleli, a brisk little seaport and popular watering-place, 22 miles by rail S. by W. of Carnarvon in Wales, with lobster and oyster fisheries.

Pyemia

etc. to return one member. Pop. of parish, 3222.

Pyemia (from the Gr. πυς, ‘pus’ and ήaimα, ‘blood’), or purulent infection of the blood, is a disease whose exciting cause is the introduction of decomposing pus or wound discharges, or the products of decomposition of animal fluids, into the circulation, either by an ulcer imperfectly closed (see Pileritis and Perforal Feyer). The term Septicismia is applied by some to the same disease, by others only to very grave cases of pyemia; while by many it is restricted to cases of blood-poisoning by pathic animal matters, which, having failed to decompose, are expelled from decomposing wounds or dead bodies, or borne on foul air or septic gases. The two conditions have a general resemblance to each other. The poison is rapidly absorbed and diffused, and the blood undergoes certain changes, the nature of which chemistry has as yet failed to detect; it is certain, however, that the blood contains micro-organisms (mierococci and bacteria; see Germ). Within twenty-four hours, in very acute cases, there are severe shiverings, headache, and giddiness followed by a loss of consciousness or delirium. In twenty-four hours more the patient may be in a hopeless condition, delirious, and rapidly sinking. In less acute cases the symptoms closely resemble those of typhoid fever, and in this form the disease is a common cause of death after surgical operations. Its most conspicuous character is the formation of secondary abscesses in the lungs, liver, kidneys, and other internal organs, in the various glands (the parotid gland in President Garfield’s case), in the joints, and in the tissues immediately under the skin. The pus of such abscesses always contains bacteria. There is usually more or less delirium. The patient generally dies of exhaustion. Recovery is rare. It is chiefly, however, in the presence of predisposing causes, such as previous illness, prostration from organic disease or surgical complaints, or from difficult parturition, unhealthy occupations, &c., that the poison acts so severely; these, with the occurrence of putrefaction in a wound, may convert a comparatively slight local mischief into infection of the whole mass of the blood.

Bearing in mind that the micro-organism which pyemia originates, it is clear that this disease is one to be prevented rather than cured. Until comparatively recently, when it was acknowledged that pyemia was the cause of death in 10 per cent. of all cases of amputation, the careful preparation of a patient before operation was, with justice, most strenuously insisted on. ‘Patients must be strengthened,’ said Mr Callender, ‘by tonics, such as quinine and iron; and their secretions must be set right by appropriate alteratives; this treatment must be continued for a considerable period.’ Diet should be attended to, and temperate patients should be accustomed to a more healthy mode of life. After operation, also, patients should be adequately supported with nutritious diet, and not with stimulants, mere stimulants. The principal minerals are coal and lead. Hot and cold mineral springs are abundant, among the most frequented being those of Mont Dore (q.v.), Châteauneuf, St Nectaire, Royat, Châteldon, &c. The department is subdivided into the arrondissements of Ambert, Clermont-Ferrand, Insole, Rom, and Thiens. Capital, Clermont-Ferrand.

Puzzle-monkey. See Araucaria.

Puzzola’na. See Cements.

Pwllhleli, a brisk little seaport and popular watering-place, 22 miles by rail S. by W. of Carnarvon in Wales, with lobster and oyster fisheries.
at Lyons, where it formerly had a permanent home; and similar testimony might be quoted from every quarter and to any extent. The use of antisepsics, adopted early and followed out intelligently, may be said to have abolished the risk of purulent infection in operated cases from operation and injury.

Even when the disease has shown itself, the use of antisepsics (perchloride and other salts of mercury, carbolic acid, boracic acid, boroglyceride, iodiform, thymol, eucalyptol, &c.) should be reported to locally. The hands, skin, and kidneys may be acted on by suitable purgatives, diaphoretics, and diuretics, with a view to the elimination of the poison; but the patient must be carefully watched for signs of depression, which must be combated with opium and stimulants, both of which should be given in small and frequently repeated doses. Quinine in moderately large doses is very serviceable throughout the whole course of such a case; larger doses may occasionally be given to reduce excessively high temperatures, though antipyretics in general must be used with extreme caution in various antisecptic drugs have been recommended for internal use, such as salicylic acid and the salicylates, the hypsophilate of sodium, and the hypophosphites generally. This treatment, combined with the most assiduous nursing and generous dieting, and the appropriate surgical measures, if secondary abscesses form, will sometimes prove successful.

Pyat, Felix, a French journalist and communist, born at Vierzon (dept. Cher), on 4th October 1810, studied law and in 1831 was admitted to the bar, but chiefly wrote articles, feuilletons, and plays, often with strong political allusions. He signed Ledru-Rollin's appeal to the masses to arms in 1848, and the attempt to avoid failure escaped to Switzerland. After that he found refuge in Belgium and England, and was a member of the 'European revolutionary committee'. Returning to France on amnesty in 1870, he made himself a leader of the Paris communists and took a foremost part in the destruction of the Vendome Column; on the fall of the Commune he escaped to London. He was tried and condemned to death, in absence, in 1873, for his share in the misdeeds of the Communal Government, but was pardoned in 1880. Marseilles chose him one of her deputies in 1888. He died 5th August 1890 at Sir Gatien.

Pycnogonida, a very remarkable group of Arthropod animals, perhaps intermediate between Crustaceans and Arachnida. The body consists of a fused cephalothoracic region, three free thoracic segments, and a rudimentary abdomen. The head usually bears a tubular proboscis, a pair of mandibles, a pair of slender palps, and a pair of egg-carrying legs; but mandibles and palps may be absent, and the egg-carrying legs are sometimes restricted to the males. Besides these there are four pairs of clawed limbs, into which prolongations of the gut extend. There is a dorsal heart; respiration is effected through the skin. The males usually carry the eggs. There is a metamorphosis in development. The pycnogonida are some of the most beautiful of all sea-plants and also Pantopoda. They are all marine, and some of them live among algae, or are to be found under stones on the beach, whilst others are dredged from deep waters. They seem to feed by sucking other animals. See Hooke, Challenger Report (iii. 1880); and Dohrn, Fauna d. Golfs v. Neapel (iv. 1881).

Pycnogonum littorale.

Pyce, Henry James, poet-laureate, was born in London, 10th July 1754, and educated at Magdalen College, Oxford, in 1772 being made a D.C.L. He held a commission in the Berkshire militia, in 1784 was elected librarian for that county, in 1790 succeeded Warson as laureate, and in the same year was appointed a London police magistrate. He died at Pinner, near Harrow, 13th August 1813. The works of 'poetical Pye' (in Scott's phrase), who, as the editor of Byron's Vision of Judgment remarked, was 'eminently respectable in everything but his poetry,' are nearly twenty in number, and include Alfred (1801), besides birthday and new-year odes.

Pygmaleon, grandson of the king of Cyprus, in love with an ivory statue of a maiden he had made, prayed to Aphrodite to give it life; and, his prayer being granted, married the maiden. There is no classical authority for calling him Gala.

In his Pygmaeon and Galatea W. S. Gilbert followed a German play.

Pygmes. See Dwarf; Quatrefages, Les Pygmées (1887); and for the two types of pygmies whom Stanley saw in the Central African forest, see In Darkest Africa (1890), and Hurwitz, In the Land of the Pygmies (1899).

Pyldades. See Orestes.

Pymun. John, was born of a good old Somersetshire stock, at Ilminster, in the county of Bridgewater, in 1554. He entered Broadgates Hall (now Pembroke College), Oxford, in 1570, as a gentleman-commoner, but left in 1602 without taking a degree, and then probably studied law at one of the Inns of Court. He married in 1614, but in 1620 was left a widower with five young children, and was first returned to parliament by Calne. This seat he exchanged in 1625 for Tavistock. He at once attached himself to the Court party, and proceeded to war against monopolies, papistry, the Spanish match, and absolutism with a vigour that brought him 'three months' duration. He was one of the members who presented a petition to James I. at Newmarket, when 'Chairs! cried the king, 'chairs! here be twal kynges comin!' and in 1626, the year after the accession of Charles I., he took a prominent part in the impeachment of the Duke of Buckingham. In the parliment he stood second only to Sir John Eliot, whom he ably supported in the debate on the Petition of Right, but whom he opposed in the matter of tonnage and poundage, deeming the privileges of parliament inferior to the liberties of the kingdom. In the short Parliament (1640), of which Clarendon says, 'men gazed on each other, looking who should begin, much the greater part having never sat before,' Pym on 17th April 'brake the ice by a two hours' discourse, in which he summed up shortly and sharply all that was most reflected upon the prudence and justice of the government, that they might see how much work they had to do to satisfy their country.' And lastly, in the Long Parliament, having meanwhile joined hands with the Scots, and ridden with Hampden through England, urging the voters to their duty, Pym in November named Strafford, twelve years earlier his friend and ally, as the 'principal author and promoter of all those counsels which had exposed the kingdom to so much ruin.' In the impeachment of Strafford which followed, resulting in his execrable death by hanging, Pym under a leading part; and Pym's is the chief credit of this master-stroke of policy, which deprived the king of the one man of resolute temper and powerful genius who supported his cause. In the proceedings against Land Pym was also conspicuous, as in the carrying of the Grand Remonstrance and in every other crisis of moment up to the time when war became inevitable; he was the one of the 'Five
PYRACANTHA

Pyramid, in Geometry, is a solid figure, of which the base is a plane rectilinear figure, and the sides are triangles, converging to a point at the top or ' apex.' Pyramids, like prisms, are named from the form of their bases; thus, a pyramid having a triangle for its base is a triangular pyramid, with a square base, a square pyramid, with any four-sided figure for its base, a quadrangular pyramid; or it may be pentagonal, hexagonal, &c. Pyramids may be either 'right' or 'oblique' (see Prism). A right pyramid, with an equilateral figure for its base, has all its sloping edges equal; but this is not the case if the pyramid be oblique. The most remarkable property of the pyramid is that its volume is exactly one-third of that of a prism having the same base and height; and it follows from this that all pyramids having the same base and height are equal to one another. The word (Gr. pyramis) is of Egyptian origin.

Pyramid, a structure of the shape of the geometric figure so called, erected in different parts of the Old and New World, the most important being the Pyramids of Egypt, which were reckoned among the seven wonders of the world. They are about seventy-five in number, of different sizes, situated chiefly between 29° and 30° N. lat., and are masses of stone (or rarely brick), with square bases and triangular sides. Although various opinions have prevailed as to their use, as that they were erected for astrological, astronomical, and metrological purposes, for resisting the encroachment of the sand of the desert, for granaries, reservoirs, &c., there is no doubt that they were really nothing more than the sepulchres of Egyptian kings, from the first to the twentieth dynasty. With the exception of some very late pyramids in Nubia, none were constructed after the twelfth dynasty; the later kings were buried at Abydos, Thebes, and Memphis, either in rock-cut tombs or in construction. The pyramids of Egypt may be described as monuments built over the sepulchral chambers of kings. The Egyptian monarch was ever careful to prepare his 'eternal abode.' For this purpose a shaft of the size of the intended temple was cut down into the rock at an incline suitable for lowering the coffin, and at a convenient depth a rectangular chamber was excavated in the solid rock. Over this chamber a cubical mass of masonry of square blocks was then placed, leaving the oriifice of the shaft open. Additions continued to be made to this cubical mass, both in height and breadth as long as the monarch lived, so that at his death all that remained to be done was to face and smooth the exterior of the step-formed mound by adding courses of large blocks on each layer of the steps and then cutting the whole to a flat or even surface. This outer masonry or casing has in most instances been stripped off. Provision was made for protecting the vertical joints by placing each stone half-way over another. The masonry is admirably finished; and the mechanical means by which such immense masses of stone were raised to their places must have been powerful and elaborate. The finer stones were quarried at Tura and other places on the opposite bank of the Nile; sometimes, however, granite taken from the quarries of Syene was employed for the casing. The entrances were carefully filled up, and the passage protected by stone portcullises and other contrivances, to prevent ingress to the sepulchral chamber. The sides of the pyramids face the cardinal points, and the entrances face the north. The most remarkable and finest pyramids are those of Gizeh (Giza), situated on the edge of the Libyan Desert, near Memphis, on the west bank of the Nile. Of the three largest and most famous the First or Great Pyramid was the sepulchre of Chufu, the second king of the fourth dynasty (2733-2666 B.C., according to Brugsch). Chufu is the Cheops of Herodotus, the Cheops or Chemis of Diodorus, and the Sophsis of Manetho. Its height was originally 481 feet, and its base 774 feet square; in other words, it was higher than St. Paul's Cathedral, on an area about the size of Lincoln's Inn Fields. Its slope or angle was 51° 59'. It has, however, been much despised and stripped of its cubical mass blocks for the building of the mosques and walls of Cairo. The original sepulchral chamber, 46 feet x 27 feet, and 10 feet 6 inches high, was hewn in the solid rock, and was reached by a passage, 200 yards long, descending to the entrance at the foot of the pyramid. The excavations in this direction were subsequently abandoned, and a second chamber, with a triangular

---

**Note:** The text above is a segment from a larger passage, focusing on the description and historical context of pyramids, particularly those in Egypt, detailing their construction, function, and significant characteristics. The passage is intended to provide a comprehensive overview of pyramids, emphasizing their architectural marvels and historical importance. The diagram illustrates a section of a Great Pyramid of Gizeh, highlighting key components and dimensions. The text is complemented by references to historical figures and landmarks, ensuring a rich and detailed understanding of the subject matter.
Pyramid

measure of capacity, of which the British quarter is the fourth part. As the heat of this chamber was stifling, two small air-channels, or chimneys, about eight inches square, were made, ascending to the north and south sides of the pyramid, which perfectly ventilate it. After the mummy was deposited in the King’s Chamber, the entrance was closed with granite portcullises, and a well made at the junction of the upward-inclined and horizontal passages, by which the workmen descended into the downward-inclined passage. According to Herodotus, this pyramid took a long time in construction—100,000 men being employed on it for thirty years. The facing-stones were said to be inscribed with writing, probably of a religious character. The Great Pyramid was opened by the Abbadide or Caliph El Mamun in the 9th century.

The Second Pyramid is situated on a higher elevation than the first, and was built by Chephren (3666-3633 B.C.), third king of the fourth dynasty. It is 450 feet high, on a base of 700 feet, and has two sepulchral chambers, which were opened by Belzoni in 1816. The pyramid is inferior to the first, but it was apparently cased below with polished stones, some of which remain, while the top still retains its original casing.

The Third Pyramid, built by Menkaura, or Mycerinus (3363 B.C.), fourth king of the fourth dynasty, is much smaller than the other two, being only 215 feet high by 350 feet at the base. It has three chambers, the lowest of which, granite lined, held a sarcophagus of white granite, but it is unknown. The inscription on the coffin reads: ‘Osiris, King of the North and South Men-Kau-Ra, living for ever.’ The heavens have produced thee, thou wast engendered by Nut (the sky), thou art the offspring of Seth, thou art Nut who spreads herself over thee in her form as a divine mystery. She has granted thee to be a god. Thou shalt never more have enemies, O King of the North and South, Men-Kau-Ra, living for ever.’ (Dodge, The Nile, 141-142). From this we may conclude that the Egyptian religion and the doctrine of immortality were fixed as early as 3600 B.C. Amongst the débris of the coffin and in the chambers were found the legs and part of the trunk of a body with linen wrapper, supposed by some to be that of the monarch, but by others to be that of an Arab. The plaster of the fragment of the original coffin were removed to the British Museum, but the stone sarcophagus was unfortunately lost off Carthage by the sinking of the vessel in which it was being transported to England. The masonry of this pyramid is magnificent, and it was apparently cased half-way up with granite, the remains of which are still visible. It was wantonly damaged by Saladin’s nephew, El-Kamil, in the 12th century, in the hope of destroying it. The Third Pyramid is regarded with superstitions dread by the natives, on account of a supposed lady’s ghost, and there is a curious legend connecting it with the courteous Rhodope.

There are six other pyramids of inferior size and interest at Gizeh; others at Abun Rodaf, six miles to the north-west of the same spot; and four (originally fourteen) at Abydos (Bunyan’s of Sedma and Us-en-ra of the fifth and sixth dynasties. A group of eleven pyramids remains at Sakkar, some of which were explored in 1880-81 by M. Maspero, such as those of Unas (3333 B.C.), Teti (3266), and Pepi (3233), all of the fifth and sixth dynasties. The so-called Step Pyramid at Sakkara is believed to have been built by Uenephes of the first dynasty. Six pyramids still stand at Dushir and that at Meydum, with a peculiar construction, is supposed to be the tomb of Snefer (3766 B.C.). Chufu’s predecessor in the fourth dynasty. There are also pyramids in the Fayyum, and some small ones of brick at Thebes. In Nubia, the ancient Ethiopia, are several pyramids, the tombs of the monarchs of Merotic from the 1st. B.C. and of some of the Ethiopian conquerors of Egypt. They are taller in proportion to their base than the Egyptian pyramids, and generally have a squarish hall, or propylon, with sculptures, which faces the east.

In Assyria the Bira Nimrud, or Tower of Belus, was a kind of step-shaped pyramid of seven different-coloured bricks, dedicated to the planets by Nebuchadnezzar. The Mijjellia, another mound, was of pyramidal shape. The pyramid
AZTEC PYRAMID, CHOLULA, MEXICO.
PYRENEES

also entered into the architecture of the tomb of Sardanapalus at Tarsus, and of the Mausoleum of Artemisia at Halicarnassus. A small pyramid, the sepulchre of C. Cestius, imitated from the Egyptian in the days of Augustus, still exists within the wall of Aurelian at Rome. Temples and other monumental pyramids of six shape are found in India, China, Cambodia, Java, the Polynesian Islands, and elsewhere. The Toltecs and Aztecs erected temples in Mexico, called Teocalli (q.v.), or abodes of gods, of pyramidal shape, with steps or terraces by which to ascend and reach an altar, generally placed on the summit, on which sacrifices and other rites were performed. These, however, are not true pyramids, the pure and simple form of which is restricted to Egypt. The pyramidal form entered extensively into the architecture of the Egyptians, and appears on the tops of chelisks and tombs as a kind of roof. Small models of pyramids, with inscribed adorations to the sun, or having royal names, were also placed in the tombs.

See Lepsius, Uber den Bau der Pyramiden (1843); Wilkinson, Topogr. of Thebes 1833; Vyse, Operations connected with the Pyramids (1842); Perring, The Great Pyramid (1888). Ingenious fancies about the supposed metrological and astrological purport of the pyramids are given in Piazzi Smyth's Our Inheritance in the Heavens, 1863, and L. W. Howitt, The Great Pyramid (1892). The astronomical data afforded by the orientation of temples and pyramids were in 1891 subjected to thorough investigation by Mr Norman Lockyer.

Pyramids, a game played on a billiard-table. Fifteen red balls are placed on the table in the form of a pyramid, the apex of the pyramid being on the "winning spot," with the base at the foot of the table. There is also a sixteenth white ball, which is used by both players when striking. The object of the players is to hole the pyramid balls. The first stroke is from hand; the succeeding strokes are played from where the white ball stops, unless the striker runs in, when his adversary plays from hand. Also, when only two balls remain on the table, the white and the red are played with alternately. When a player holes a pyramid ball he scores one, and plays again on any ball he likes. If a player runs in or gives a billiard to the first ball, or strikes the red ball, he is replaced on the table on the winning spot, or as near in a straight line beyond it as it will go without touching another ball; if the player has made no score, he owes one, and the first red ball he holes is placed on the table. When all the red balls are holed, the lower score is deducted from the higher, and the difference is the number of lives won. The game is generally played for so much a life, with a stake on the pool equal to the value of three lives. The lives are not paid for when taken (as at pool), but the difference in the scores is recorded on a slate marking-board at the conclusion of each game.

The principal varieties of pyramids are shell out and snooker. Shell-out is pyramids played by more than two persons. The only differences are that, if a player runs in or makes, one is deducted from his score, but no ball is replaced on the table, and that the last ball scores two. At snooker, in addition to the pyramid balls, some of the pool balls (beginning with the yellow) are placed on various spots on the table. A red pyramid ball must first be played, and, if holed, is h 1 oyed, then play on a pool ball. The pool balls score two, three, four, five, and six respectively, according to the order of their colours on the marking-board; running in or missing when playing on a pool ball scores nothing but, if holed, is added to the opponent's score. When a pool ball is holed, it is replaced on its original spot, and the striker must next play on a pyramid ball. When all the pyramid balls have been holed, the pool balls are played on in the order of their colours, but are not then replaced when holed.

A great point is to avoid being "snookered"—i.e. to play on a pyramid ball so that if holed a pool ball is left open, and vice versa. If a player is "snookered," his adversary at once scores the value of the nearest pool ball. Some rules compel the striker to name the ball played at, when, if he fails to hit it, he is snookered off that. The rules of snooker vary much in different rooms.

Pyramus and Thisbe. The tragic history of these two lovers is told by Ovid in the 4th book of his Metamorphoses. They were natives of Babylon, and tenderly attached to each other, but, as their parents would not hear of their marriage, they had to content themselves with clandestine interviews by night. On one occasion they arranged to meet at the tomb of Ninus, where Thisbe, who was first at the trysting-spot, was startled to discover a lioness. She immediately ran off, but in her terror and haste dropped her garment, which the fierce animal, that had just torn an ox in pieces, covered with blood. Soon after Pyramus appeared, and, seeing his mistress's tunic, came to the conclusion that his beloved was dead, and inquired, whereupon he killed himself. Thisbe now returned, and, beholding her lover lying dead on the ground, put an end to her own life. The story was a favourite one during the middle ages. Bottom pronounces it "a very good piece of work and a merry" in A Midsummer Night's Dream.

Pyrenees, the mountain-chain that divides France from Spain, and extends from the Mediterranean to the south-east corner of the Bay of Biscay, a distance of 270 miles; the breadth of the system varies between 5 and 70 miles, and the area it covers measures 13,000 sq. m. The Pyrenees form a regular and continuous chain, divisible into three portions, the Western, the Central, and the Eastern Pyrenees. The first-named division extends eastwards from the Bay of Biscay to the Port de Canfranc (or Col de Somport), a carriageway that crosses the chain at an elevation of 5380 feet, and leads from Oloron to Saragosuza. This division is divided into two sub-divisions, the higher, altitude height being 3300 to 4300 feet. Here two passes give access to Spain, that of St Jean Pied de Port (or Ronclevalles) and that between Bayonne and Elizondo; the railway from Bayonne to San Sebastian passes the end of the chain close to the sea. The Southern Port de Pyrénées is formed by the Port de Canfranc to the Col de la Perche, this connecting the valley of the Frenéli Tet (dept. Pyrénées-Orientales) with the valley of the Spanish Segre (prov. Lerida), contain the highest peaks and the most imposing mountain- masses of the entire system, as Pic de Néthou (in Maladeta), 11,168 feet; Mont Perdu, 10,998; Vignemale, 10,794; Marboré, 10,673; and Pic du Midi, 9466. The summits of the Eastern Pyrenees, which extend eastwards from the Col de la Perche (5390 feet), the second pass over the lofty chain, range between 6500 and 7500 feet (Puigmal, 9545; Canigou, 9138); and, although the altitude decreases as they approach the Mediterranean, they still reach 2100 feet in the Alberes close to the sea. This portion is crossed by the old Roman road from Figueras to Perpignan used by the railway to form the line between the same two towns. The frontier between France and Spain coincides generally with the line of highest summits in the main chain; the principal exception is that at Maladeta the frontier is carried 800 feet above the frontier. By the new railways Spain the valley of Aran, which geographically belongs to France. On both north and south the mountains sink down to the plains in a series
of terraces, with precipitous faces, the general slope on the Spanish side being somewhat steeper than that on the French side. The valleys cut into the mountain mass on both sides almost directly at right angles, in the form of deep ravines, and with the regularity of the spines of a fish’s backbone, along whose length are cut the calibre-shaped basins, called cirques, or by the native mountaineers oulets (= poits), the sides of which are precipitous and seamed with waterfalls; the most celebrated is the Cirque of Gavarnie, at the head of Gave de Pau, with a waterfall 700 feet high. Of the French streams that have their origin in the mountains, those on the Spanish side are for the most part feeders of the Ebro, whilst the French streams—generally called gaves—feed the Adour, the Garonne, and certain little rivers that reach the Mediterranean. The lower Pyrenean valleys through which these streams flow are in many cases covered with grass or forest, or even vineyards and olive-groves. Snow lies on the highest summits, the snow-line being put at 9200 feet on the south side and at 8900 on the north. A few rivers rise about 2500 feet to within 1500 feet just below the peaks of the Central Pyrenees, but almost wholly on the French side. Vegetation is most developed in the Western division, where the rainfall is heaviest; but, whilst it is there central European in its characteristics, the vegetation of the less humid slopes is similar to that of the Mediterranean coast. The geological nucleus of the range is granite, which comes to the surface in most of the highest peaks. But above the granite lie strata of nearly all subsequent ages, especially Silurian deposits, Cretaceous limestones (limestone and limestones = marly limestone) of the Eocene period. Minerals are not generally abundant, though iron is worked in the French departments of Basses-Pyrénées and Pyrénées-Orientales; coal exists on the Spanish side and lignite on the French. There are numerous mineral springs (several being hot), those of Eaux-Bonnes, Canterets, Eaux-Chaude, Bagneres de Bigorre and de Luchon, and Barèges being the best known. Except the passes already mentioned, the Pyrenees are crossed only by mountain-paths, that none but foot-passengers can use, and they only in the summer; the most remarkable of these is the valley of the west side of Mont Perdu. A great number of caves exists amongst the limestone formations, and in them valuable remains of prehistoric man have been found. See works by Perret (1854), Fréaud (1877), Taine (5th ed., 1893), Camena d’Almeida (1893), and Truitat (1891); guide-books by Geel-Fels, Joanne, and Murray; and Count Henry Russell, Pau, Biarritz, and the Pyrenees (new ed. 1891).

Pyrénées, Basses, a department in the south-west corner of France, between the Landes and Spain, and having the Bay of Biscay on the west. Area, 2946 sq. m.; pop. (1891) 425,027. It is divided into the arrondissements of Pau, Oloron, Ordos, Bayonne, and Mauléon. Chief town, Pau. The department comprises the northern slopes of the Western Pyrenees (3000–9800 feet), offshoots from which divide the department into a number of valleys, traversed by mountain-streams (gaves). The chief are the Gave d’Oloron, and Gave de Pau, and other tributaries of the Adour. The Bidasoa, with which the whole length of the boundary of 1659 was signed, forms the dividing line between France and Spain for a short distance. The high valleys and slopes are generally fertile, and well adapted for the growth of the vine, chestnut, and other fruits. Agriculture is the principal industry; large herds of cattle are raised, and tomato and vegetables are grown in the valleys, and many swine in the forest. Of the numerous mineral springs the most important are those of Biarritz, Eaux-Bonnes, and Eaux-Chaude. The western half of the department is the home of the Basques (q.v.).

Pyrénées, Hautes, a department of France, lying east of Basses-Pyrénées, is a part of the old province of Gascony. As its name implies, it contains the loftiest summits of the Pyrénées (q.v.), and is distinguished from the others by the town of Tarbes, Argeles, and Bagneres de Bigorre; chief town, Tarbes. The principal rivers are the Adour and the Gave de Pau. The climate is generally mild in the plains and sheltered valleys. The well-cultivated and artificially watered lowlands yield good crops of cereals, vegetables, fruits of every kind, including the grape. Cattle, sheep, and swine are reared. Marble and slate are quarried. In this department are the springs of St Sauveur, Bagneres de Bigorre, Barèges, and Cauterets. Area, 1749 sq. m.; pop. (1891) 225,861.

Pyrénées-Orientales, a southern department of France, is bounded on the E. by the Mediterranean and on the W. by the Pyrénées. Area, 1501 sq. m.; pop. (1891) 210,125. It is divided into the three arrondissements of Perpignan, Prades, and Ceret. The chief town is Perpignan. Like the other Pyrenean departments, this one embraces a series of parallel valleys formed by the rivers from the Pyrenean slopes. In the north and east of the department. Agriculture is extensively prosecuted, but vines constitute the wealth of the district, and include the red wines of Rousillon, the white unseated of Rivesaltes, and others. This department takes the front rank as a producer of mineral oil; granite, slate, and stone are quarried. There are mineral springs at Amelie-des-Bains, and elsewhere.

Pyrrthrum, a genus of plants belonging to the natural order Compositae. The species are by some botanists included in the genus Chrysanthemum. Feverfew (q.v.), a native of Britain, is a notable species. A handsome double-flowered variety is cultivated in gardens for ornament; and Golden Feather, so much employed in bordering, &c. in the bedded-out system of flower-gardening, is a yellow-leaved variety. Several other species are to be met with in flower-gardens; but the most ornamental of all is P. roseum, from which has sprung a great variety of beautiful and single flowers of brilliant colours. From the flowers of the P. roseum insect-powder (q.v.) or Persian powder is prepared; and the flowers are exported in large quantities for this purpose from Dalmatia and from the Canaeas region.

Pyrheliometer, a radiative thermometer (for measuring the direct heating effect of the sun’s rays), consisting of a body heated by the sun’s rays and a thermometer. See THERMOMETER.

Pyrites, a name employed by mineralogists to designate a large class of minerals, which are compounds of metals with sulphur, or with arsenic, or with both. They are crystalline, hard, generally brittle, and frequently yellow. The name pyrites originally belonged to the sulphide of iron, known as iron-pyrites or simply pyrite, and was given to it in consequence of its striking fire with steel (Gr. pyr, ‘fire’), so that it was used for kindling powder in the pans of muskets before gun-flints were introduced. Pyrite (iron-pyrites) is commonly of a bright brassy yellow, and is found crystallised in cubes, in which form small crystals of it are abundantly disseminated in some roofing-slates, and very large ones occur in some of the mines of Cornwall; it is also found crystallised in amethyst and topaz, and in other forms, more rarely in opaque four-sided prisms; and it often occurs massive, globular, stalactitic, capillary, or investing
other minerals as an inersatation. Beautiful specimens of globular pyrite are found in the chalk of England. It is a very widely diffused and plentiful mineral, occurring in many different kinds of rock. It is too abundant in many coal-seams, the action of water and air changing it into sulphate of iron, (pyrites), during which change so much heat is evolved that the iron is frequently kindled by it, mines become unworkable, and the progress of the fire can only be stopped, if at all, by building up portions of them to cut off the access of air, or by the admission of a plentiful supply of water. Sulphur, always the pyrites, ought not to be employed for building purposes, as it is prone to oxidation. Sometimes it is changed into sulphate of iron, but when other bases are present in the rock the sulphuric acid often unites with these in preference, leaving the iron of the original sulphide free. The iron then becomes oxysulphide, and appears as dark brown blotches. The presence of pyrite thus leads to corrosion and unsightly staining. The colour of pyrite has often caused it to be mistaken for gold, a mistake which its hardness and comparative lightness enables copper or iron, but it is much employed in the manufacture of sulphuric acid, and sulphur is obtained from it by sublimation. It is also used for the manufacture of alum. A rather unstable variety of iron disulphide of a very pale colour is called Marcasite; it crystallises in orthorhombic forms. Another sulphide of iron known as Pyrosulphite (Fe₂S₃) is magnetic.

Copper Pyrites, also called Yellow Copper and Chalcopyrite, is the most abundant of all the ores of copper, and yields a large proportion (perhaps a third) of the copper used in the world. It is brass-yellow, the colour varying with the amount of copper which it contains, a rich colour indicating much copper, and a pale colour the presence of a comparatively large amount of iron; for this ore is not a sulphide of copper alone, but of copper and iron. It occurs massive and disseminated in rocks of almost every class, and is often found crystallised in octahedrons and tetrahedrons, but generally in very small crystals. It may at once be distinguished from iron pyrites by its severe softness, yielding readily to the knife, and by the green colour of its solution in nitric acid. Before the blowpipe, with borax and soda, it yields a bead of copper.—Cobaltite, an arsenio-sulphide of copper, is a principal ore of cobalt. It is generally of a silver-white colour, and occurs massive, disseminated, or crystallised in cubes, octahedrons, dodecahedrons, and polyhedrons, in schistose rocks. —Nickelit, used as an ore of nickel, is a compound of nickel and arsenic. It is generally found massive, and is of a copper-red colour; hence it is called by the German miners Kupfernickel, because they mistook it for an ore of copper.

Pyritz, a manufacturing town of Pomerania. 25 miles SE. of Stettin by rail; pop. 8062.

Pyrmont. See Waldeck-Pyrmont.

Pyrogallic Acid. See GALLIC ACID, PHOTOGRAPHY.

Pyrogallic Acid, or Wood VINEGAR, a crude commercial form of Acetic Acid (q.v.). It is made by the destructive distillation of wood, and, besides acetic acid, contains tar, cresote, wood naphtha, and other products, which have to be removed if it is required in a very pure state. The best woods for the distiller are ‘hard’ woods, although all will yield it. Oak branches stripped of their bark are cut into short billets, which are placed in cast-iron retorts, and a sufficient heat applied to drive off the volatile constituents and carbonise the wood. This acid is of great use in the arts, especially in making the acetates used by dyers and tanniers, but it is not sufficiently pure, and is very carefully purified and properly diluted with water, used extensively as a substitute for common vinegar in pickling, and even for table use. It is also used in the preservation of fish, giving them a ‘smoked’ flavour.


Pyrometry, the measurement of temperatures beyond the compass of the mercuriul Thermometer (q.v.). The leading methods are oculair, calorimetric, and pyrometric. The eye alone is often sufficiently accurate, and can distinguish dull red, 525° C. (say 95° F.); cherry red, 800° C. (say 1450° F.); orange, 1100° C. (2000° F.); white, 1300° C. (2350° F.); dazzling white, 1500° C. (2700° F.). Of these, the cobalt glass as a means of identifying and more sharply discriminating the temperatures of high colour. Calorimetric: a lump of heated metal is thrown into a known quantity of water; the rise of temperature is measured; the temperature of the heated metal is next calculated from its specific heat, its specific gravity, and the rise of temperature and the quantity of the water. This method admits errors from loss of time and radiation; hence only rough results are attained, comparable with one another, but not numerically reliable. Of pyrometric methods may be named expansion of air, hydrogen or nitrogen (only suited for laboratory purposes, for glass melts, metals become permeable, and porcelain is fragile), or of mercury vapour; dilatation of solids—porcelain, platinum, or iron (Professor J. F. Daniell, 1821)—whose expansions are very small and difficult to measure, as they generally take up a new set or form when alternately heated and cooled; the shrinkage of clay (Wedgewood’s pyrometer) giving variable results; the actual fusion of definite metals, alloys, or enamels whose melting-points have been previously ascertained; the temperature is measured by water made to flow uniformly through a tube partially exposed to the heat to be explored; the speeds of outflow of air through an aperture at the atmosphere and at the furnace temperature (Barns, American Journal of Science, 1839); Siemens’ electric pyrometer, which measures the change in the resistance of platinum wire exposed to the furnace heat; Bequerel’s thermo-electric pyrometer, in which a thermo-electric couple (platinum-palladium) is exposed to the heat. When Le Châtelier’s thermo-electric couple, consisting of platinum and platinum plus ten per cent. of rhodium, is used, the readings of a thermo-electric pyrometer may be consistent with one another.

The whole subject of pyrometry was carefully discussed by M. Le Châtelier before the French Société Technique de l’Industrie du Gaz at its annual meeting in 1889; and a summary of his address will be found in The Gas World, March 15, 1890. See also Poggendorf’s Annalen, vol. xxii.; and for Ericsson’s Solar Pyrometer, see Nature, vol xxx.

Pyrope, a gem, often called Carbumele and Hyacinth by lapidaries, which is nearly allied to garnet. Clean and transparent pyrope of siliceous, lime, and the protoxides of iron, chrome, and manganese, it is always of a deep red colour, and is transparent, or at least translucent. It generally occurs in rounded grains, but rarely in imperfectly cubic crystals. It is found chiefly in Saxony and Bohemia, also at Elie in Fife (where they are called Elie Rubies).
Pyrophone, also called Flame-organ, is a musical instrument invented about 1873 by Eugene Kastner (1832–82) of Paris, in which the musical tones are produced by flames of hydrogen gas burning in tubes of different sizes and lengths, arranged somewhat as in an ordinary organ.

Pyrophorns (from the Gr. πυρ, 'fire,' and φως, 'phoro,' I bear') is a term applied to any substance which burns first and rapidly with the rapidity with which they are oxidised. If iron, coal, or nickel be reduced by hydrogen from its oxide at a low red heat, it is obtained in a state of such extreme division as to become incandescent by the oxidising action of the atmosphere; and the tendency to rapid oxidation is much the inferior in the case of some infusible matter, as a little alumina or magnesia, between the particles of the oxide. This is probably due to the cohesion of the minute particles of the reduced metal being thus mechanically prevented, and the access of air to the surface of each particle being thus facilitated. If tartar of lead be heated in a tube till the organic portion becomes charred, the metallic lead is reduced to a state of extreme subdivision, and usually takes fire when poured into the air. If finely-powdered sulphate of bismuth be mixed with half as much nitro-glycerine, black, and heated in a covered crucible, the sulphate is reduced to sulphide of potassium, which remains in a finely-divided state, mixed with the excess of carbon, and takes fire spontaneously in the air from the rapid absorption of oxygen. These are amongst the earliest pyrophors.

Pyrosis. See Indigestion.

Pyrosoma, a genus of compound or colonial Tunicates, sometimes called 'fire-flames' on account of their brilliant phosphorescence. The colonies are hollow cylinders, open at one end, and the walls are formed of hundreds of individuals. These have inhaled apertures on the exterior, while their exhalent apertures open into the cavity of the cylinder, thus producing a gentle current, by means of which the colony is slowly propelled through the water with the closed end foremost. Several species occur in the warmer seas, and P. giganteum is from 2 to 3 feet long. See ASCIDIANS, PYROTECHNY.

Pyrotechny, the art of making fireworks, is of unknown antiquity. It was practised amongst the Chinese from very early times, and has attained with them so much perfection that the beauty and ingenuity of their devices have often been admired by Europeans. Fireworks, as the name is now understood, consist of an inclosed case of combustible material, usually but not always known in Europe until the nature of gunpowder became known, and for a long time only very simple pyrotechnic contrivances were used. The compositions employed for most kinds of fireworks are of the nature of gunpowder. That is to say, the mixture of which they are composed contain combustible or oxidizable substances, along with bodies available for their rapid combustion, since these latter contain large quantities of oxygen.

The most frequently employed combustible materials are carbon (charcoal) or some compound of carbon, such as sugar, gum, and sulphur; or a compound of this element, such as sulphide of antimony. Such bodies as charcoal and sulphur burn slowly in common air, because its oxygen is largely mixed with nitrogen, which does not support combustion; but when they are compounded with nitrates and chlorates the store of oxygen in these salts being given off by heat enables the firework composition to burn at a more or less rapid rate whenever a spark is applied to it. It is not desirable, however, to have too sudden a union of combustible matter with oxygen, hence violent explosions, like nitro-glycerine, are unsuitable for showing coloured or brilliant flames. The two most important oxidising ingredients used in firework compositions are nitrate and chlorate of potash. Iron, in the form of cast-iron or steel, and in a state of fine division, is a frequent ingredient in fireworks, and to some extent the powder or filings of zinc, copper, antimony, and some other metals are also employed. When the particles of these metals are highly heated they produce sparks and scintillations of different colours. A few substances, such as sand and sulphate of potash, are used to modify the rate of combustion.

Variety of colour is much studied in the production of fireworks, as it contributes greatly to their beauty. The colours usually seen are those given by simple metals when burned. Compounds of the metals form part of the mixtures, and these are reduced to the metallic condition in a state of very fine division by contact with the carbon present in the hot mass. A yellow colour is one of the most easily managed, any of the common compounds of sodium producing it. Copper gives a green colour when burned in a hydrogen flame, which changes to blue in the presence of a little free chlorine; so that when copper is used as the oxidising substance containing hydrogen is added, and when employed for blue, calomel (one of the chlorides of mercury) is put into the mixture. Nitrate of barium is also employed for green. Salts of strontium give fine crimson tints, because compounds in which strontium (a very light substance) is present are red. Among the substances used to produce white colours are sulphide of antimony and sulphide of arsenic.

The cases which contain the firework compositions are usually made of paper or pasteboard, or both, pasted in layers. They are usually cylindrical in shape, and the proportion of length to diameter, and the size of openings for the escape of the burning mixtures, are matters of importance. So also is the proper mechanical construction of the fixing of the fireworks. Touch-paper, prepared with a solution of nitrate of potash in alcohol, is used for capping squibs, crackers, and indeed for all kinds of fireworks; quick-match of cotton-wool, which has been saturated with gunpowder, gum, and other ingredients, connects the parts of each design. In the form of pencil-like articles filled with saltpetre, sulphur, and gunpowder, are used to fire the touch-paper cappings.

The simpler kinds of fireworks include squibs, crackers, gerbs, Roman candles, stars, sparks, serpents, thead-foxes, Bongal lights, &c. Squibs are small stout paper tubes filled with grained powder, to which a little charcoal, sulphur, and steel filings are sometimes added, a sufficient quantity of bursting powder being put in to cause a slight explosion at the end when fired. Crackers consist of a tube bent into folds, and containing meal-powder, charcoal, sulphur, saltpetre, and sometimes iron filings in varying proportions. The folds are tied by a cord; and on a cracker being fired a report is given at every turn of the tube. Serpents are tubes, some of which have a choke in the middle. When fired they give a hiss and a hissing noise. Gerbs consist of a straight cylindrical case filled with a composition which produces a bright sparkling jet of fire somewhat in the form of a waterspout. They sometimes contain coloured stars. Roman candles have a reservoir for the powder and the oxygen. In fire-guns the stars are placed at intervals along the tube between layers of the composition. Stars are of different kinds, such as simple stars, tailed stars, and pointed stars. Simple stars consist of saltpetre, sulphur, and fine gunpowder made into a paste-ball with gum and spirits of wine, and dried.
Sometimes they contain iron filings. Many compositions are, however, used for stars, their various colours alone necessitating this. Sparks, or small stars, are also made of different colours. *Marooun* are small boxes, round or square, bound with a cord, and containing a composition which explodes with a light. *Pyrrhos* are still more complicated. The compositions vary according to colour, which are burned in small saccers: for example, a red light can be produced by a mixture of chlorate of potash, nitrate of strontia, sulphur, and lampblack; and a green by chlorate of potash, nitrate of antimony, chlorate of strontia, and lampblack, and nitrate of silver. These *fires* are produced by slow-burning compositions containing some colouring ingredient. They are burned without cases on a fireproof slab; and all substances obnoxious when burned indoors, such as sulphur, antimony, and arsenic, or their compounds, should be omitted in preparing them. Magnesium powder and the minute spores of one or more species of lycopodium are used to imitate lightning in theatres.

The most complicated kind of fireworks are some of the *rocket* kind. These are called wheelers because they have a framework of nave and spokes, round the rim of which cases of the nature of rockets are arranged. They revolve on a pin or metal spindle, and the motion of the rocket is produced, as will be presently explained, by the recoil as the fire escapes, which is considered as connected with each other by levers. There are a number of different forms, but they may be classed under three kinds —vertical, horizontal, and spiral wheels. In the case of the last, a rod (nave) rises vertically from the centre of the horizontal wheel, forming the base, and upon the rod cases are arranged so as to form a spiral. *Pin* or *Catherine wheels* and *pastilles* consist each of a long paper case coiled round a rod in the form of a flat spiral, the case being, of course, filled with a burning composition. *Stars* are either fixed or revolving. Fixed stars are of various designs, but a common kind has a number of cases radiating from a centre, from which jets of fire proceed outwards. By a suitable arrangement the fire is communicated at the same time to the mouths of each of the cases. *Revolving stars* are somewhat similar to spiral wheels with spokes. Of ascending fireworks the *rocket* is the most familiar, and it has been known from an early period. It consists of two parts —viz. a long stick to guide it in its course, and a head. The latter, of strong paper and cylindrical in shape, has its lower portion formed into a hollow cone, base downwards, and round this cone is the burning composition. The object of the cavity is to effect a rapid combustion, which fills it with heated gases, and these, issuing downwards through a small hole in the base, force the rocket up through the air. The upper portion of the head is separated from the lower by a perforated plug of plaster of Paris, through which a fuse passes, so that when the lower portion is burned, the upper, which has a conical head, takes fire and sets off its garniture of stars, saccers, and other ornaments. When fire-arms are discharged there is a recoil, in the case of a heavy gun, of a short distance; in the case of a light cannon, with a larger charge in proportion to its weight, of a much greater distance; and in the case of a rocket in a fixed position, with a light barrel the recoil is great enough to send it high in the air. The motion of a fire-wheel is explained in the same way, there being a recoil caused by the backward pressure of the heated gases on the atmosphere as each case on the ring of the wheel is burned, and the gases escape or ascend at the same time. Upward motion is given by the fire escaping from holes on the under side of the cylinder, and rotatory motion by its finding vent from holes at the ends, but on opposite sides.

Aquatic fireworks, in which the devices which come in contact with the water require to be protected with grease or oil, consist of skimmers or water-devils, floating Chinese trees, gerbs, and Roman candles, water-mines, water fire-fountains, &c. Among recent novelties in pyrotechny are firework-pictures of battles, reviews, and other scenes. Of these perhaps the most popular is the enlargement, in lines of fire, of the portrait of an ancient or modern hero whose incendiary or regal gathering has taken place. The displays of fireworks on some occasions of national rejoicings in Great Britain have cost sums approaching or exceeding £30,000. The greatest displays of comparatively recent date have taken place during the visits of foreign sovereigns to the country. See also LIFE-SAVING APPARATUS, ROCKETS, SIGNS; and T. Kentish, *The Pyrotechnist's Treasury: Art of making Fireworks* (2d ed. 1887).

**Pyroxenes**, a group of minerals, comprising both monoclinc and rhombic forms. The monoclinc pyroxenes are silicates of lime, magnesia, and iron, usually all three being present in some, while others contain a larger percentage. The more important monoclinc forms are Augite (q.v.) and Diablage (q.v.), both being constituents of igneous rocks. The rhombic pyroxenes are silicates of iron and magnesium. There are three: Eustatite (q.v.), which contains less than 5 per cent. of ferrous oxide; Bronzite (q.v.), in which the percentage is from 5 to 15; and Hypersthene (q.v.), containing 15 per cent. and upwards. All these are important constituents of igneous rocks.

**Pyroxylic Spirit**, also called *Wood-spirit* and *Wood-naphtha*, is a mixture of acetone, methyl-alcohol, acetate of methyl, &c., obtained by the destructive distillation of wood in the manufacture of Pyrogelious Acid (q.v.). Many of its properties are the same as those of common alcohol; and now, notwithstanding a long opposition from the Revenue Board, its manufacture and importation are regularly allowed. It is of nearly equal value to alcohol in making varnishes, as it dissolves the resins, oils, and other similar substances. It has a peculiar naphtha-like odour, which is inseparable from it, and prevents it also as a potable spirit at present; but it is asserted that some makers produce it almost odourless, and that it sometimes takes the place of common alcohol in the manufacture of coffee perfumes. It is used in making Methylated Spirit (q.v.).

**Pyroxylin**, a name for cotton (q.v.).

**Pyrrhic Dance**, the most famous war-dance of the ancient Greeks, especially the Spartans. The name was said to be derived from Pyrrho, the inventor of the dance. The *Pyrrhic measure* in prosody consisted of two short syllables. See DANCING.

**Pyrrho** (Gr. *Pyrrhôn*), the founder of a school of Greek scepticism, named after him, was a native of Elis, born in the third quarter of the 4th century B.C. A pupil of Anaxarchus, he followed him when he went in the train of Alexander to Asia and India. He lived to be ninety years old. Our knowledge of his system is derived principally from his pupil, Timon, the *Syllograph* (i.e. *writer of syllos, *satiric* poems*); he himself left no writings. Pyrrho taught that we can know nothing of the nature of things, but that the best mental attitude is suspense of judgment, which is called *equinoxia*. His writings were regarded as *alia latae sensus* or *non posse plus ultra* of (philosophical) scepticism; consistent Pyrrhonists were said even to doubt that they doubted.
Pyrrhus, king of Epirus, born about 318 B.C., a Greek warrior, was the son of Ecdices and a distant kinsman of Alexander the Great. After experiencing many vicissitudes of fortune in his youth, he became sole king of Epirus in 295 B.C., and in that year invaded Italy with a large army, by the addition of the western parts of Macedonia. In 281 B.C. a glorious prospect opened up before the eyes of the restless warrior—the conquest of Rome and the western world, which would confer on him a renown equal to that of his Macedonian kinsman; but Pyrrhus's colonists, called the Lower Italy, then at war with the Romans, sent an embassy to Pyrrhus, in the name of all the Greek colonies in Italy, offering him the command of all their troops against their enemies. The king was overjoyed at the proposal, instantly accepted it, and in the beginning of 280 B.C. sailed for Tarentum with 20,000 foot, 3000 horse, 2000 archers, 500 slingers, and a number of elephants. The pleasure-loving Tarentines were far from pleased at the strict measures taken by Pyrrhus to inure them to the hardships of war. The first battle between Pyrrhus and Romans, which was fought on a plain near the town, produced a decided victory for the Greek; the Romans lost, according to the version of the narrative current among the ancients, 86,000 men, including both soldiers and civilians. The Romans, however, were not disheartened by this disaster, and continued to fight for their country. Pyrrhus, on the other hand, was overjoyed at the prospect of defeating a great power, and decided to march against the Roman empire, which he intended to conquer. He crossed the Adriatic, and in the autumn of 276 B.C., landed in Campania, and was met by a Roman army under the command of the consul, Tiberius Sempronius. The two armies met near Cumae, and the battle was fought with great bravery on both sides. The Romans were victorious, and Pyrrhus was compelled to retreat. He then pursued the Romans for a distance of 20 miles, and returned to Rome, where he was received with great honor. He then returned to Epirus, and his name was inscribed on the list of great conquerors. His victory was a great blow to the Romans, and it was a turning point in the history of the Italian peninsula. He then proceeded against Argos, where he met with a defeat, and was compelled to retreat. He then returned to Rome, where he was received with great honor.
Python

to mark a transition from the crude Hylozoism of Thales and the Ionic philosophers to a formal or rational or conceptual contemplation of the world, developed, say, by the Eleatics, and culminating in Plato. Their idea of a quantitative combination of elements to become a complete theory of Greek speculative cosmos, constituting the ground for a deductive ontology. The conception general of a measure or proportion in things is, of course, most pronounced trait in the Greek mind. It is easy thinking is the Pythagoreans doctrine of the elements and the contraries and of combination and of spherical completeness all the essential features of Greek cosmology. The influence of Pythagoreanism and geometrical conceptions over the mind of Plato can hardly be exaggerated. The chief interest of the Pythagoreans doubtless lay in the domain of physics, and their astronomical theories may be said to constitute their capital achievement. If we remember, too, that Pythagoras is perhaps the first Greek thinker who conceived of philosophy as first a life, a life in common, we shall see in this the beginning of the legislative and ethical view of the philosopher's function expressed in the fullest way in Plato's Republic. The ascetic and mystical aspects of Pythagoreanism linked it closely with Platonism in the mind of Christian thinkers in later times. See Neoplatonism.


Python. See Delphi.

Pythian Games. One of the four great national festivals of the Greeks, held in the Cisinean plain, near Delphi (anciently called Pytho), are said to have been instituted by Apollo after vanquishing the snaky Python. The Games were held in his honour every four years. Originally the contests were restricted to singing, with the accompaniment of either-playing; but flute-playing, athletic contests, horse-racing, contests in poetry and art were afterwards introduced, and long continued a distinguishing feature of these games which are believed to have lasted down to nearly the end of the 4th century a.d. The prize was a laurel-wreath and the symbolic palm-branch. Several of Pindar's extant odes relate to victors in the Pythian Games.

Pythias. See Damon.

Python. A name applied to several large serpents, especially of the genus Python, which inhabit tropical Asia, Africa, and Australia, and closely resemble both in structure and habit the Ious of the New World. The body is rarely 20 feet in length, usually indeed nearer 10, though often estimated at 40; it is plump and very muscular; the tail is prehensile, the two rudimentary useless or 'spurs', which have perhaps a sexual function besides being of use in climbing. The pythons usually lurk near water, among the herbage or on an overhanging tree. They seize small mammals, strange and crush them in their coils, and swallow them slowly. They do not cover them with saliva before beginning to swallow them, reports to this effect being inferences from the appearance of the occasionally disgorge prey. After a heavy meal the serpents
are very lethargic. The animals on which the pythons ordinarily feed are seldom larger than a small dog, and though they may seize and overpower animals as large as a goat, to swallow them "horns and all" is absolutely impossible. We must allow for about fifty per cent. of exaggeration in almost all the popular stories about pythons. It is true, however, that the mother reptile coils herself around her pile of eggs and incubates them for about three months. Among the pythons are the following: the Netted Python (P. reticulatus) of the Malay Archipelago, Burma, and Siam; P. molurus, the Adiijter of the Hindus; P. regia, the Royal Rock-snake of West Africa; P. natalensis, sometimes of the form of a dove, which was hung suspended over the altar. More commonly, however, it was, as its name implies, a simple box, generally of the precious metals, or, at least, of metal plated with gold or silver. At present the pyx is commonly cup-shaped, with a close-fitting cover of the same material. The interior is ordered to be of gold, or at least plated with gold. Like all the other sacred utensils connected with the administration of the eucharist, it must be blessed either by a bishop, or by a priest delegated by a bishop.

**Pyx**. Trial of the, the annual trial by weight and assay of the gold and silver coins of the United Kingdom issued from the mint during the preceding year. It is so called from the Pyx—i.e. box or chest—in which are deposited specimen coins. Before the coins are weighed into bags at the mint for issue to the public, two pieces are taken out of each 'journey-weight' (180 oz. Troy in the case of gold, and 720 oz. in that of silver coin), one for assay within the mint, the other for the pyx. The latter are sealed up and deposited in the chest or pyx. The trials were formerly held at Westminster at uncertain intervals of several years, the jury being sworn before the Lord Chancellor or an archbishop, and the president once being Prince Rupert, another time Pitt. Now the trial takes place, to use the words of the Coinage Act, 1874, 'at least once in each year in which coins have been issued from the mint,' at Goldsmiths' Hall, and is made by a jury of goldsmiths presided over by the King's or Queen's Remembrancer, who from 1874 to 1886 was Sir Frederick Pollock (cf. his Remembrances, vol. ii. pp. 272-4). The pyx chest, having been brought to the Hall in the custody of officers of the mint, is opened in the presence of the jury, who proceed to examine the coins in regard to their number, weight, and fineness, in accordance with the provisions of an order in council dated the 29th June 1871. The standard weights used, as well as the trial-plates, are produced by an officer of the Board of Trade. The weight of the total bulk is ascertained, as well as that of selected specimen pieces, and assays are taken from a bar formed by melting a number of coins as well as from separate coins. The verdict recording the results of these several trials releases the officers of the mint from their responsibility in regard to the coinage, and affords a public guarantee that the standard of the currency is well maintained. See Assaying, Mint.
These Cadet bedfellows, other which were derived from the native Gaulish, were among the Greeks. Among the Ionian Greeks it was disused as a letter before the middle of the 5th century B.C., keeping its place only as a numeral. It was retained for a while in the Dorian alphabet, lingering longest on the coins of Corinth. On the coins of Syracuse it was replaced by $k$ about 480 B.C. In the Italian alphabet, which was obtained from Greece before the letter was disused, the symbol was appropriated for the favorite Latin sound of the veler guttural $kw$. The letter $q$ is absent from the Anglo-Saxon alphabet, in which the sound was expressed by $ce$, as in even for queen, and esue for quick. It makes its appearance about 1160, and at first was only used for Latin or French words, such as quarter or quarrel. Before the close of the 13th century it was adopted in genuine English words, such as quaff, quell, quick, and queen. In Scotland it replaced $kw$, as in quhate for hwat (what). In English it is always followed by $u$.

Quack Doctors. Medical quackery is a product of all countries and of all ages; it flourished among civilised and uncivilised communities alike, and was as rampant before the Christian era as it is in our own day. At all times it has found a numerous public ready and willing to be gulled, and this not only among the illiterate and vulgar, but even specially among the higher and better educated classes. In many cases royalty itself has set the fashion by lending its patronage to notorious charlatans. An exact definition of what constitutes medical quackery is not easy to give. The term 'quacksalver' is no longer in general use in the 17th century for quack or doctor, seems to be derived from the Dutch kwakzaaver (Ger. quacksaliber), meaning a person who praised loudly his own medicines or methods of cure. The first part of the word is derived from the well-known but unmusical note of the duck, and typifies the hoarse blustering tones in which itinerant medicine vendors are accustomed to laud their wares. The equivalent French term is Charlatan, derived from the Italian ciarlastare, 'to chatter' (Lat. circulari; circulator, 'a pedlar or voulteh'mak')—a name which also indicates their characteristic and persistent loquacity. In more ancient days the loquacity and persistence were verbal; now they are both verbal and literary, as is shown in the deluge of advertisements with which medical quacks flood the world.

Quackery may be taken to include all devices—whether practised by legally qualified medical practitioners or by those who have had no recognised medical training—which tend to deceive the public by disseminating false ideas of disease, or a belief in imaginary ailments, which vanitt certain medicines or methods of treatment, as panaceas or cure-alls, or which attribute to an individual a supernatural or exceptional power of influencing and curing disease. The element of pecuniary gain or of personal vainglory also comes into a definition of quackery, as opposed to the singleness of purpose and devotion to the interests of the patient which are traditionally held to be the guiding principles of the orthodox practitioner of medicine. Perhaps the most amusing description of quacks and their methods has been given by Goldsmith in his Citizen of the World, and it is as true and as trenchant today as it was then. He says: 'Whatever may be the merits of the English in other sciences, they seem peculiarly excellent in the art of healing. There is scarcely a disorder incident to humanity against which they are not possessed with a most infallible antidote. The professors of other arts confess the inevitable intricacies of things, talk with doubt, and decide with hesitation. But doubting is entirely unknown in medicine; the advertising professors here delight in cases of difficulty; be the disorder ever so desperate or radical, you will find numbers in every street, who, by levelling a pill at the part affected, promise a certain cure without loss of time, knowledge of a bedside, or hindrance of business. When I consider the assiduity of this profession there is little wonder it amazes me. They not only in general give their medicines for half value, but use the most persnve monsternences to induce the sick to come and be cured. Sure there must be something divertingly ostentatious in an English patient who refuses so much health upon such easy terms.'

The Sieur de Courval, writing in 1610, gives a lamentable account of the way in which France, Germany, and Italy were overrun with medical quacks in his day. He describes them as being apostates, vagabonds, disgraced clergy, women of loose character, and rascals of all kinds, and says that they are more dangerous to mankind than vultures, for the latter devour only the dead, while the former prey upon the living. Cadet de Gasscourt, classified quack doctors in a whimsical manner in groups, families, and species, of which the following is an abridgment. *Circulatores: Insects, very venomous, of the order of suckers; common everywhere, found in all countries and all latitudes. Their external characters are very varied. Some have brilliant elytra, velvety, and studded with gold; others have them more coarsely formed, dull, not entire, and marked with rents. Their intestines have an enormous capacity, the heart is wanting or very small; they attack man exclusively, their stings being always injurious and sometimes mortal. The sting is sometimes very evident, sometimes quite hidden or little apparent. He divides them into two great groups, the *Circulatores Phanerophyne,* or peripatetic quacks who practise in public, and the *Circulatores Cryptorophyne,* or *Charlatans en Chambre.* The latter are described as 'the charlatan of the aristocracy, of the bourgeoisie, and of those who do not wish to be seen consulting him in public. This honest son of toil is imbued with a sense of his own importance, his language is simple and direct, he speaks with assurance, and is lodged luxuriously. He is often a specialist,' and so on. These two groups are further largely subdivided, and an amusing description given of each species.
The methods of quack doctors have been the same from all time, and consist principally in attracting and sustaining public attention by extraordinary surroundings and behaviour, and in loudly and persistently asseverating the virtues of their nostrums. This is essentially advertising; and while the invention of printing has stimulated the practice, there are few which it has been necessary to suppress than that of the quack doctor, as it at once opened the way to a much wider public. The enormous modern spread of newspaper reading has further been largely turned to the quack to his own advantage, as it opens up a still wider field for the pursuit of his vocation. When once public attention has been caught, the battle is more than half won; patronage, popularity, and success follow almost as a matter of course. Fortunately these are frequently of a very temporary character; but, as quack doctors are essentially a migratory tribe, this drawback troubles them comparatively little. When they return to their old haunts a new crop of dupes is certain to have come up. The success of quacks must be attributed largely to an imperfect knowledge among the general public of what constitutes disease, and to the fact that there is an often imported, faith in the curative power of drugs. There is little popular conception of what is possible or impossible in the way of healing, and thus the most absurd and extravagant statements are received as facts. Their success, however, has a deeper origin—viz., the natural craving of human passions—the desire to preserve life. The strong desire for life, health, and the relief of pain clouds the judgment and causes the chance of relief from any source to be eagerly grasped at. The popular love of the marvellous and mysterious has also been an assistance in pushing the fortunes of many quacks.

Quack medicines, as a rule, form no real additions to our means of treating disease. Almost without exception they are formulas taken from some old or modern pharmacopoeia, or the prescription of some well-known physician, christened with a name calculated to strike the popular fancy, and then pulped and advertised into fame. Such remedies are to be found for every real and imaginary ailment of mankind; but the happy hunting-ground of the quack is more especially in the regions of chronic, but not fatal, disease, such as the multiform rheumatic affections, chronic skin affections, asthma, hysteria, hypochondriasis, 'nervous disorders,' and a host of others. Persons afflicted with such ailments have naturally alternations of good, bad, and indifferent health, and are often very prone to attribute what is simply natural improvement to the action of the remedy last taken. It is such people who certify so confidently and so gratefully to the curative powers of quack medicines. Cures for cancer, sterility, and consumption, various elixirs of life and youth, and单 antidotes efficacious against all poisons must alone have made the fortunes of many thousands of quack doctors. The sad part of the whole matter is that mankind never seems to learn by experience; no new methods of deception are employed, and no real organized enterprise is ever shown by quacks; they rely upon exactly the same old artifices as their predecessors did, and generation after generation are duped by them just as surely.

Quadragesima (Lat. quadragesima, 'a fourth part'), literally the fourth part of time, or 90°, but signifying, in Astronomy, an instrument used for the determination of angular measurements. The quadrant consisted of a limb or arc of a circle equal to the fourth part of the whole circumference, graduated into degrees and parts of degrees. Herat was the first who applied telescopic sights to this instrument. Quadrants were adjusted in the same way as the mural circle. Various innate defects of the quadrant—such as the impossibility of securing exactness of the whole are, concentricity of the centre of motion with the centre of rotation, and perhaps also by carelessness—led to its being superseded by the repeating circle, otherwise called the Mural Circle (q.v.). Hadley's Quadrant is more properly an octant, as its limb is only the eighth part of a circle, though it measures an arc of 90°. Its principle is that of the Sextant (q.v.).

Quadrature. The 'quadrature' of a plane curve is effected when a square is found which has the same area as the given curve. Practically it is effected when any rectilinear figure of equal area has been found for it. There is thus an equivalent square which has been obtained by the process of finding the area of the curve in terms of any square unit. The great problem in quadrature has been the Quadrature of the Circle. The workers in this subject may be divided broadly into two classes: (1) trained mathematicians, who clearly understand the nature of the problem and the difficulties which surround it; and (2) those who do not understand the nature of the problem or its difficulties, and who think that they may, by good fortune, succeed where others have failed. Most of the workers of the second class became greatly diminished when the search for 'perpetual motion' became general. And, at the present day, the ranks (now fortunately small) of the perpetual-motionists and the circle-squarers are almost entirely composed of unfortunate individuals whose mental capacities are small, in too many cases the impairment of their faculties having been brought about by a development of their fruitless idea into monomania. Apart from its great historical interest to the mathematician, the subject serves also as a detailed model of such theories may be useful in preventing further waste of mental energy by some who, were their energies properly directed, might succeed in increasing the sum of useful knowledge.

The nature of the problem may be understood from the following brief account. Let an equiangular n-gon be inscribed in a circle, and let its corners be joined to each other and to the centre. The area of each triangle so formed is $\frac{\pi}{2} \sin \frac{\theta}{n}$, where $n$ is the base of the triangle, $r$ is the radius of the circle, and $\theta$ is one of the angles of the triangle. The area of the polygon is $\frac{n}{2} \sin \frac{\theta}{n} r^2$; and this can be made as nearly equal to the area of the circle as we please by making $r$ sufficiently large. In the limit, when $n$ is infinite, the two areas are equal. But, when $n$ is infinite, $\theta$ vanishes and $\sin \theta$ becomes $\theta$; therefore the area of the circle is $\frac{\pi}{2} r^2$, or $\frac{\pi}{4} (r^2)^2$; that is to say, it is equal to the area of a triangle erected on the radius of the circle as base and of height equal to the circumference of the circle.

The arithmetical quadrature of the circle would therefore be effected if we could find the value of the ratio of the circumference to the diameter—that is, the value of $\pi$ in the equation $\pi = 2\pi r$. The geometrical quadrature would be effected by finding a geometrical method of drawing a straight line equal in length to the circumference.
It has long been known that the arithmetical solution of the problem is impossible, for it has been proved that the quantity \( \pi \) is incommensurable. And proofs have been advanced that the geometrical quadrature is also impossible; but these proofs are by no means simple, and do not always convince those who are able to judge of their accuracy. Still, apart from such proofs, the mere consideration of the fact that (discounting inanimate workers) the question has been fruitlessly attacked by the ablest mathematicians of past centuries should be sufficient to deter any reasonable man from attempting the solution.

It follows that the probability of a solution being possible is excessively small—too small to justify the staking of a man’s sanity, or at least the uselessness of his life, upon the result. Any mathematician who now consents the question seeks not for a solution, but for a simple and convincing proof that a solution is impossible. (It must be remembered that a ‘geometrical’ solution means a solution which involves no more postulates than those of Euclid.)

In 1655, by geometry, in 1698, gave a proof of the impossibility of the geometrical quadrature which Huygens, although he at first objected to it, finally admitted in so far as it applied to any sector of a circle. Newton also gave a proof of this limited problem, but his proof is not conclusive.

Against Huygens, it is true, he has made the practical measurement of the quantity \( \pi \). By a consideration of the inscribed and circumscribed 96-gons he proved that it lies between 3\( \frac{1}{8} \) and 3\( \frac{1}{4} \). This result is correct only to the second decimal figure, two Huygens himself in 1655, 1667, and 1672. Proclus gives 3\( \frac{141552}{96} \). A great improvement on previous results was made by Peter Metius in the 16th century. His result was correct to the sixth decimal place inclusive; but its correctness was accidental, for he gave two fractions between which the result lay and he thought he had the arithmetical means of the numerators and the denominators in order to obtain his final numerator and denominator—a totally unwarranted method. Vieta gave the result correct to the ninth decimal place inclusive; Adrianus Romanus gave it correct to the fifteen, and Snell introduced considerable improvements in the method, and gave 55 decimal figures. Abraham Sharp gave 75, Machin 100, De Lagny 128, Vega 140. The latter result is only correct to 156 places.

Of this class of problems, the geometrical quadrature, which the result (given to 154 places) is correct to 152 places. In 1846 Dase gave a result with 200 decimals, and, in the following year, Clausen gave 250. In 1851 Shanks gave 315, which were extended by Rutherford to 350; and, shortly afterwards, Shanks gave 527, which has been extended to 607. An interesting experimental method was adopted by R. A. Smith. He tossed a thin rod upon a uniformly planked floor, the length of the rod being three-fifths of the breadth of a plank. If \( t \) the length of the rod, while \( b \) is the breadth of a plank, the probability of a rod intercepted so that \( b/t = \) \( x \) is obtained from the result of 3204 tosses, he found \( \pi = 3.1412 \). The true value to 20 places is 3.14159265358979323846.

Any one who is desirous of a more detailed historical account may consult De Morgan’s article on the subject in his Budget of Paradoxes (1872).

## Method of Quadratures

The name is applied to any arithmetical method of determining the area of a curve. When the exact area is known a square whose area is equal to it can be found—hence the term ‘quadrature.’

It has been shown, under the heading Calculus, that the area of a curve whose equation is \( y = f(x) \) is \( \int_{a}^{b} f(x) \, dx \), and can therefore be found when the integral can be evaluated. Hence the approximate determination of the value of a definite integral is obtainable by the method of quadratures.

Let it be required to find the area bounded by a portion of a curve, the ordinates at its extremities, and the axis. The usual method of procedure is to divide the portion of the axis which is included between the two ordinates into a number of equal parts, and to erect ordinates at the points so obtained. The area is approximately equal to the product of one of the given equal parts into half the sum of the two extreme ordinates together with the sum of all the intermediate ordinates. This approximate result by this process the number of equidistant ordinates must be so great that the portions of the curve which are intercepted by successive ordinates are very nearly straight.

A better method, due to Simpson, consists in drawing, through the first, second, and third points obtained as above on the curve, a parabola whose axis is parallel to the ordinates, and repeating this process with the third, fourth, and fifth points, and so on—till the points being chosen so that the total number of ordinates is even. The result of this given curve will be approximately equal to the sum of the areas of the various portions of the parabolas included between successive ordinates when these ordinates are sufficiently close together. It is therefore approximately equal to one-third of the sum of all the odd intermediate ordinates and four times the sum of all the even intermediate ordinates.

When the successive equidistant ordinates are very close together, the area is approximately equal to the product of the common intercept on the axis between successive ordinates into the sum of all the ordinates. The labour involved in the estimation of an area by this process would be fatal to its employment unless the number of ordinates was small. But, if the ordinates were few in number, considerable error would in general result unless a correction could be applied. This method is adopted in that process which is known as the method of quadratures par excellence, and which is as follows: Let \( y_0 \) be the several equidistant ordinates, and let \( a \) be the intercept on the axis between \( y_0 \) and \( y_n \). Also let \( x \) be the sum above referred to; and let \( y_0 = y_1 = \ldots \), \( y_n = y_{n+1} = \ldots \), \( a_0 = a_1 = \ldots \), \( a_n = a_{n+1} = \ldots \), \( y_1 - y_0 = y_2 - y_1 = \ldots \), \( y_n - y_{n-1} = \ldots \), and so on. The value of the whole area is (not \( a \), but)

\[
x = \frac{1}{6} \left( y_0 + y_n \right) - \frac{1}{4} \left( y_1 + y_2 + y_3 + \ldots + y_{n-2} + y_n \right) + \frac{1}{2} \left( y_2 + y_3 + \ldots + y_{n-2} \right) - \frac{1}{3} \left( y_1 + y_3 + \ldots + y_{n-1} \right) + \frac{1}{4} \left( y_2 + y_4 + \ldots + y_{n-2} \right) - \frac{1}{6} \left( y_1 + y_5 + \ldots + y_{n-3} \right) + \frac{1}{2} \left( y_3 + y_5 + \ldots + y_{n-3} \right) - \frac{1}{3} \left( y_2 + y_6 + \ldots + y_{n-4} \right) + \ldots,
\]

It will not in general be necessary to proceed beyond the fifth difference. As an example we shall find the area of the curve \( y = x^2 \) between the limits \( x = 10 \) and \( x = 15 \). In this case all differences beyond the third vanish, and \( a = 0.5 \) if we make eleven ordinates in all. The following table represents the results:

<table>
<thead>
<tr>
<th>( x )</th>
<th>( y )</th>
<th>( \Delta y )</th>
<th>( \Delta^2 y )</th>
<th>( \Delta^3 y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>5</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>7</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>9</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>11</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>7</td>
<td>49</td>
<td>13</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>8</td>
<td>64</td>
<td>15</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>9</td>
<td>81</td>
<td>17</td>
<td>34</td>
<td>55</td>
</tr>
<tr>
<td>10</td>
<td>100</td>
<td>19</td>
<td>38</td>
<td>68</td>
</tr>
<tr>
<td>11</td>
<td>121</td>
<td>21</td>
<td>42</td>
<td>81</td>
</tr>
<tr>
<td>12</td>
<td>144</td>
<td>23</td>
<td>46</td>
<td>95</td>
</tr>
<tr>
<td>13</td>
<td>169</td>
<td>25</td>
<td>50</td>
<td>110</td>
</tr>
<tr>
<td>14</td>
<td>196</td>
<td>27</td>
<td>54</td>
<td>126</td>
</tr>
<tr>
<td>15</td>
<td>225</td>
<td>29</td>
<td>58</td>
<td>142</td>
</tr>
</tbody>
</table>
Hence we have $z = 22515\times 0.5 - 11257\times 0.25$; 
$\frac{1}{2} \times 0.5 \times (y_1 + y_2) = 1003.75$; 
$\frac{1}{2} \times 0.5 \times (\Delta y_1 - \Delta y_2) = 0.61456$; 
$\frac{1}{2} \times 0.5 \times (\Delta y_1 + \Delta y_2) = 0.75193$. 
We therefore get by this method, approximately, for the value of the area the quantity $10156.25$. The correct value is 10156.25, and so the error is less than one in twenty thousand.

This method is of extreme utility in the evaluation of definite integrals when rigorous processes are not attainable.

**Quadrill.**

Quadrilateral, the name given in history to the four fortresses of North Italy—Mantua, Verona, Peschiera, and Legnago—which form a sort of outwork to the bastion of the mountains of the Tyrol, and divide the north plain of the Po into two sections by a most powerful barrier. They have figured in all the later wars that have been fought in North Italy, especially in the wars between Austria and the different Italian states—Russia has a similar combination of four fortresses in Poland, called the Polish Quadrilateral. See Novogrjegevs.

**Quadrilla.** A dance of French origin, introduced about 1686 into England. It consists of consecutive dance movements, generally five in number, danced by four or more couples, opposite to, or at right angles to, each other. See DANCING.

**Quadrille.** A game at cards, very fashionable about two centuries ago. It is very similar to the Spanish game of Ombre (q.v.), with the necessary alterations to fit it for a four-handed game. When whist came into fashion after 1740, quadrille began to lose favour.


**Quadrup.** The offspring of a mulatto and a white person; the name indicates a man or woman who is 'quarter-blooded.'

**Quadruman.** (Lat., 'four-handed'), in the zoological system of Cuvier an order of Mammalia, which he placed next Bimana, and which contained the animals most nearly resembling man in their form and anatomical character—viz. the monkey andlemur families. See Anthropoid Apes, Mammals, Monkeys.

**Quadruple Alliance.** A league formed August 1718 between England, France, Austria, and Holland to counteract the ambitious schemes of Alberoni. It was made upon the basis of the Triple Alliance which was formed in the January of 1717 between England, Holland, and France, and by which the clauses in the treaty of Utrecht having reference to the accession of the House of Hanover in England, the renunciation by the Spanish king of his claims on the French throne, and the accession of the House of Orleans to the French throne should the young king, Louis XV., die without issue, were guaranteed. The Spanish fleet was destroyed by Ryng off Cape Passaro, while the French crossed the Pyrenees and inflicted several defeats upon the Spaniards; and at length Philip was compelled to dismiss his ambitions minister, and accept the terms of the Quadruple Alliance, January 19, 1720.

**Questor** was anciently the title of a class of Roman magistrates, reaching as far back, according to all accounts, as the period of the kings. The oldest questor was the questores parricidi ('investigators of murder,' ultimately public accusers), who were two in number. Their office was to conduct the prosecution of persons accused of murder, and to execute the sentence that might be pronounced. They ceased to exist as early as 366 B.C., when their functions were transferred to the Triumvirii Capitales. But a far more important though later magistracy was the orders classicis, to whom was entrusted the charge of the public treasury. They appear to have derived the epithet of classicis from their having been originally elected by the centuries. At first they were only two in number, but in 421 B.C. two more were added. Shortly after the breaking out of the first Punic war the number was increased to eight; and as province after province was added to the Roman Republic they amounted in the time of Sulla to twenty, and in the time of Cæsar to forty. On its first institution the questorship (questorship) was open only to patricians; but after 421 B.C. plebeians also became eligible.

**Quagga** (Equus—or Asinus—quagga), one of the three species of striped wild horses, or more properly wild asses, peculiar to Africa, of which the zebra is the type. Formerly found in profusion south of the Vaal River, beyond which its range seldom extended, it is believed to be now quite extinct. The illustration represents the last animal of its species owned by the Zoological Society; it was sent from the Cape by Sir George Grey in 1838. The quagga was a handsome animal, more strongly built than the mountain zebra and Burcheil's zebra. The upper parts of the body were dark rufous brown, becoming gradually more fulvous, and fading to white at the rump and ventral surface, the dorsal line dark and broad, widening over the crupper. The head, neck, mane, and shoulders were striped with dark brown, gradually waxing fainter till lost behind the shoulder. It was usually
found in herds of from ten to a hundred, but often in troops of many hundreds on the plains of the Orange Free State and Cape Colony, and often associated with the white-tailed gun, not seldom with ostriches. The quagga was swift and enduring, but could be run down by a first-rate horse. Its extinction was mainly wrought by the Orange Free State and Transvaal Boers, who killed thousands annually for their skins. In the old days it was tamed with success, was more tractable than the zebra, and even bred in captivity. The term Quagga is a corruption of the old Hottentot name Jurela, bestowed in imitation of the ant bear living neigh of this quadruped. The quagga is not to be confounded with Burchell's zebra, which is often erroneously called quagga by hunters of the South African interior.

Quail (Coturnix), an Old-World genus of the Partridge family (Perdidae), ranging over the temperate Paleartic, Ethiopian, and Oriental regions, and in the Australian region to New Zealand. The quails are the smallest of the partridge family. Six species are described in this restricted genus. The best known is the Common Quail (Coturnix communis). In size it is about 14 inches long; the general color is brown, varied with buff, and on the under parts buff. The male is somewhat smaller in size, is brighter, and has a reddish throat and two dark-brown bands descending from the ear-coverts and ending at the throat in a blackish patch acquired at the second year. Quails fly rapidly and take long and fatiguing journeys. Mense flock visit the coun-

dervastation is rapid, for they range the Mediterranean, especially during the spring emigration; and they are accustomed to lay their food in large numbers—17,000 have been brought home in one day, and in the small island of the Bay of Naples, over 160,000 have been caught in a single season. The male is brown, but the majority pass northwards. In England quails are spring visitors; they are becoming scarcer, but at times there is a great influx. Northwards the numbers are fewer, but nests have been found in the northernmost mainland of Scotland, and in the Orkneys, Shetlands, and Outer Hebrides, and in summer they reach the Faroe Islands. A few remain on the south-west coast of England and in Ireland during winter, but the majority leave in October; many pass the winter in the south of Europe and in North Africa; and the species is resident in the Canaries, Madeira, and the Azores. It is also found at the Cape in Madagascar and Mauritius, and in Egypt, while in Palestine, as of old (Exod. xvi. 13), quails come up at night and cover the land. It ranges to India and China, and passes the cold season in those countries. Its flesh is considered delicious, and in the countries they commonly visit the arrival of the quails is eagerly expected. Quails feed chiefly on insects and slugs, but also on grain and seeds, and they seek their food in the evening. In habit they are unsociable, unamiable, and passionate with their own species. They are partly polygamous, partly monogamous. The

female is, however, an excellent and careful mother. She builds her nest of bits of plant life, but lays from seven to fourteen eggs, pear-shaped, light brown in colour, with dark shading. The young are full grown in six weeks, and two broods may be reared during the season. The call-note of the male is three-syllabled, and from it the quail is known and distinguished. The quail is widely distributed in Barbary and in the Ethiopian, Indian, and Australian regions. Australia possesses a genus, Synoicus, peculiar to itself, which includes four species. The American Quails, of which there are about sixty or forty species, are found in the family or sub-family Odontophoridae, and differ in habit from all the Old-World forms in perching upon trees. The Virginian Quail (Ortzy virginianus), known as the Partridge and the Bob-white, from its calling-note, and the Californian Quail (Laportea California), is found in Texas, is seldom introduced into England as game-birds, but they have not yet become resident there.

Quain, a family of eminent medical men. (1) JONES Quain, born in November 1796, at Mallow in Ireland, studied medicine at Dublin and Paris, and in 1829 was appointed professor of Anatomy and Physiology in the Aldersgate School of Medicine, London. Two years later he was made professor of Anatomy and Physiology at London University, and held that post until 1836. He died in London on 27th January 1865. That well-known students' text-book, Quain's Elements of Anatomy, was originally written by him; the first edition appeared in 1828, the tenth in 1890. Jones Quain published also a series of elaborate Anatomical Plates (1858) and a translation of Martinet's Pathology (1835).—(2) RICHARD Quain, brother of the above, was born at Fermoy, Ireland, in July 1800, studied at London, and was appointed professor of Anatomy and Clinical Surgery in University College, London, in 1837. He was likewise appointed surgeon-extraordinary to the Queen, and was elected president of the Royal College of Surgeons in 1848. He died in London on 15th September 1887. Amongst his works the principal are Anatomy of Arteries, with folio plates (1845), Diseases of the Rectum (1854), Observations on Medical Education (1865), Some Defects of Medical Education (1870), and articles on Dialogetions of the Hip and the Knee, he edited along with others the fifth edition of (Jones) Quain's Anatomy. By his will he left nearly £75,000 to University College, London, for the education in modern languages (especially English) and in natural science of two students each year. Richard Quain's first cousin to both the above, was born at Mallow on 30th October 1816. He was Lumleian lecturer at the Royal College of Physicians (Diseases of the Muscular Walls of the Heart) in 1872, and Harveian Orator, The Younger (Atoni, or Prophetic Aspects) in 1883, and was made physician-extraordinary to the Queen. He edited the Dictionary of Medicine (1882; 2d edition, 1894), and contributed to the Trans. of the Med. and Chirurg. Soc., the London Jour. of Medicine, &c. Dr Quain was made LL.D. of Edinburgh in 1889, president of the General Medical Council in 1891,
was created a baronet in 1601, and died 13th March 1608.—(4) Sir John Richard Quain, born at Mallow in 1817, the half-brother of James and William, was appointed judge of the Court of Queen's Bench in 1872, and justice of the High Court of Judicature in 1875. He died 12th September 1876. Along with H. Holroyd he published The New System of Common Law Procedure (1852).

Quakers. See FRIENDS.

Quantification of the Predicate, a phrase belonging to Logic, and introduced by Sir W. Hamilton, according to which all Syllogism Logical propositions are divided, according to their quality, into affirmative and negative, and, according to their Quantity, into universal and particular ('All men are mortal,' 'Some men live eighty years'). If we combine the two divisions we obtain four kinds of propositions. Sir W. Hamilton affirmed that the statement of the Quantity of these various propositions is left incomplete; only the subject of each has its quantity expressed ('all men, some men, no men'); while there is implied or understood in every case a certain Quantity of the predicate. Thus, 'All men are mortal,' is not fully stated; the meaning is, that all men are a part of mortal things, there being (possibly and probably) other mortal things besides men. Let this meaning be expressed, and we have a complete proposition to this effect: 'All men are a part of (mortal) mortals,' where quantity is assigned, not only to the subject, but also to the predicate. The first result of stating the quantity of the predicate is to give eight kinds of propositions instead of four; the next result is to modify the process called the Conversion of Propositions, Resolution (All A is B, some B is A) is resolved into simple conversion, or mere transposition of premises without further change. 'All A is some B,' 'Some B is all A.'

The multiplicity of variations in propositions is attended with the further consequence of greatly increasing the number of syllogismim, or forms of deductive reasoning (see SYLLOGISM). In the scholastic logic, as usually expounded, there are nineteen such forms, distributed under four figures (four in the first, four in the second, six in the third, five in the fourth). By ringing the changes on the same number of premises, the number of the old number, four, thirty-six valid syllogism can be formed in the first figure. Whether the increase serves any practical object is another question. Sir W. Hamilton also considered that the new system led to a simplification of the fundamental laws of the syllogism.

Professor De Morgan also invented and carried out into great detail a plan of expressing the quantity of the predicate. It should be noted that in the Contemporary Review of 1873 Professor Jevons, following Mr Herbert Spencer, recognised the fact the discovery of the quantification of the predicate, regarded by him as the most fruitful discovery in abstract logical science since the time of Aristotle, was fully contained in George Bentham's Outlines of a New System of Logic. This work was in 1827, and reviewed by W. Hamilton in the Edinburgh Review, long ere he himself published anything on the doctrine of quantification. Boole's system of logic was based on his doctrine of quantification of the predicate. See Jevons's Logic; Bowen's Treatise on Logic (Cambridge, 1860).

Quackocks. See SOMERSETSHIRE.

Quarantine (from the Fr. quarantaine, a period of forty days) is a forced abstinence from communication with the shore which ships are compelled to undergo when they are last from some port or country where certain diseases held to be infectious, as yellow fever, plague, or cholera, or are supposed to have been so. Where a quarantine is established (1603) it is a punishment of the fine prescribes. Any person in the suspected ship to come on shore for any one to disembark any merchandise or goods from her, except at lazarettas, which are establishments provided for the reception of goods or passengers or crew, and where such purifying processes as the sanitary science of the time prescribes are applied. Prolonged quarantine in bad quarters is apt to produce new diseases in typhus, &c. Until a ship is discharged from quarantine she exhibits a yellow flag at the mainmasthead if she has a clean bill of health, and a yellow flag with a black ball if not clean; a black flag is exhibited at the same place. The permit to hold intercourse after performing quarantine is called Pratique. Quarantine is not of necessity limited to a land frontier; and it is enforced at the frontiers between contiguous states. History describes quarantine regulations for maritime intercourse to have been first established by the Venetians in 1197 A.D.; but the practice must have been greatly older on land-frontiers; and the precautions of the Jews against leprosy indicate that a species of quarantine was enforced by them. The tossing, or an unquantifying quarantine was enforced in 1624. The law of 6 Geo. IV. chap. 78, amended by 29, 30 Vict. chap. 90; power to proclaim any place subject to quarantine and prescribe regulations being vested in the Privy-council. See BILL OF HEALTH.

Quarles, Francis, a minor religious poet, belonged to a good Essex family, and was born at the manor-house of Stewards near Romford in 1592, being baptised on 5th May. He studied at Christ's College, Cambridge, and at Lincoln's Inn, and was successively cup-bearer to the Princess Elizabeth, secretary to the famous Archbishop Ussher, and, like Middleton and Ben Jonson, Chronicler to the city of London (1639). He married in 1618 a wife who bore him eighteen children, and penned shortly after his death a touching short memoir, prefixed to Solomon's Recantation (1645). Quarles was a bigoted royalist and churchman, suffered losses and calumny in the cause, and died 8th September 1644. His works were of various kind, some in prose, and his books were extraordinarily popular in their day. Nor are his Divine Emblems and Enchiridion entirely unworthy of their reputation. Pope's lines in the Dunciad are familiar to everyone:

Or where the picture for the page stone,
And Quarles is saved for beauties not his own.

But the clever gibe is not entirely justifiable, for the Emblems, in spite of verbose and dull if edifying moralising, helpless bad taste, not infrequent lubes, and ever present monotonous, shows wealth of fancy, excellent good sense, felicity of expression, and occasionally a bright though intermittent flash of the poetical. A collection of short essays and meditations, affords many an example of compact and nothaphoric prose, while its antithesis and word-play are often effective and sometimes fine.

His poetical works include A Feast for Women (1620);
Hudibras, a History of Queen Elizabeth (1621); Aegyptus and Persia; his only long poem not directly religious (written apparently about 1622; first extant ed. 1629); Sions Elephants ned by Jeremi the Prophet (1624); Job Miliantis (1624); Emblems Sacri in Britain Solomon the Wise (1625); Divine Poems, a collection containing many poems printed before (1630); The Historie of Sannson (1631); various Elegiac Poems (between 1630 and 1649); Divine Poems, set forth in a New Light in Britain, and Observations (1632); the famous Emblems (1635), to which were added in 1638 Hierogliphica of the Life of Man; Solomon's Recantation (1645); and The Shepherds.
Quartermaster. In the British army the quartermaster-general is a staff-officer of high rank (major-general or colonel) who deals with all questions of supply, transport, marches, quarters, fuel, clothing, &c. He ranks next after the adjutant-general in seniority under the command-in-chief at the War Office, and has under him two assistants and three deputy-assistants. The army in India has a similar staff for these duties, and so has every division; but since 1849 the title of quartermaster-general (British) has been substituted for that of assistant-quartermaster-general on the staff at home. In a brigade the duties fall upon the brigade-major. A quartermaster is an officer on the staff of a depot, a cavalry regiment, or an infantry battalion, charged with the care of stores, issues of clothing, food, forage, and fuel, allotment of barracks, tents, &c. In the native army of India he is a combatant officer of the staff-corps, but in other cases he is commissioned from the ranks as honorary lieutenant, and promoted after ten years' service, or for distinguished conduct, to the honorary rank of captain or major. In the Royal Artillery there are 44 quartermasters, in the Army Service Corps 49, and in the Royal Engineers 120, not counting those in the militia and volunteer regiments. At the War Office and elsewhere, on duties different from those mentioned above; the War Office librarian, for instance, in 1891 being a quartermaster of the Royal Engineers. The daily pay of a quartermaster is 8s. for infantry; 9s. 6d. for garrison artillery and engineer officers, or 10s. 6d. for engineer officers in addition in the latter corps; and 10s. 6d. for mounted troops, rising every five years by increments of 1s. 6d. to 15s., 15s. 6d., and 16s. 6d. respectively. After twenty years' commissioned service, or when fifty-five years of age, a quartermaster is compulsorily retired on a pension of £200 a year, or somewhat less if his total service as a soldier does not amount to thirty years. A quartermaster-sergeant assists the quartermaster in a regiment or battalion.

In the navy the quartermasters are first-class petty officers; at sea they are stationed at the con, their duty being to take care that the helmsmen keep the ship on her proper course, and also to see that all orders from the officer of the watch affecting the movements of the helm are promptly executed and correctly executed; and in sinking the log and in taking soundings when necessary. In harbour they keep regular watch at the gangways, looking out for boats arriving and leaving, and conveying the necessary orders for the carrying out of the work of the ship. Their pay depends upon their rank, $25 for a quartermaster, number of good-conduct badges, &c., and will be found under the heading Petty Officer.

Quartermaster. His 1824, the H.M. quire a deduction, containing only the sixth part of a gallon, and often less. Quartermaster. See Building Stone, Blasting. Quart., the fourth part of a Gallon (q.v.). The ordinary quart-bottle is a deception, containing only the sixth part of a gallon, and often less. Quarternet. See AGUE. Quar-ter, a measure of weight, equal to the fourth part of a hundredweight — i.e. to 28 lb. avoirdupois. As a measure of capacity, for measuring grain, &c., a quarter contains 8 bushels.

Quarter-day. See TERM.

Quarter-deck, that part of the upper deck which extends from the mainmast or gangway amidships to the poop, or where there is no poop, to the stern; in modern turret and barbette war-ships it generally extends from the after-turret or barbette to the stern. It is the place of honour, and is sometimes referred to as the Queen's Park. Each officer and man stepping upon it salutes it, as a mark of respect to the majesty of the throne. 'H.M. quarter-deck' is used as a promenade by officers only, at sea the weather side, and in harbour the weather side of the senior officers. Persons of distinction and officers are received on the quarter-deck; and when the captain addresses the men, or confers rewards or honours on any individual, it is on the quarter-deck that the officers and men fall in for the purpose.

Quartering. See HERALDRY; also EXECUTION, TREASON.

Quarterly Review. John Murray, conscious of the growing power and influence of the Edinburgh Review, and strongly disapproving of its Whig opinions, set about the organisation of a work which should counteract what he believed to be its dangerous tendencies. Accordingly, in September 1807, he wrote to Canning with a view to securing the services of some of the greatest talents and importance.' Though Canning does not seem to have replied directly, his cousin, Mr. Stratford Canning, introduced Gifford (q.v.) to Murray in January 1808, and arrangements were afterwards made whereby he became its first editor. Murray took Gifford with him, and with which work he was occupied, he reviewed on Murray the Edinburgh (1808) that Scott's feelings as a gentleman and a Tory must be wounded, and that he would break his alliance with the whole Whig clique. He judged truly, and in a conference with him at Ashleiesteet, in October 1808, he secured his assistance and co-operation. Scott not only wrote to his brother Thomas, C. K. Sharpe, Morritt, and Southey, on behalf of the first number, but sent a letter of advice to Gifford, and became himself a considerable contributor. The first number, rather more literary than political in tone, appeared at the end of February 1809. A second edition of 4000 was sold at once, of which 500 went to Ballantyne in Edinburgh. The publisher bravely persevered, though up to the fifth number not one had paid its expenses, and though £5000 of capital was embarked in it. The undertaking was a success, 14,000 being printed, and Southey, who was its 'sheep anchor,' wrote that 'Murray is a happy fellow living in the light of his own glory.' Great drawbacks were Gifford's unpopularity, and occasional ill-health. Only two numbers appeared in 1809, due in January, in August; and No. 61, due in April, in December. Gifford, resigning the editorship in 1824, was succeeded by John T. Coleridge, who edited only four numbers; his successor was John Gibson Lockhart (q.v.). Murray's original offer to Gifford as editor was 100 guineas a number for contributions, and £200 a year as editor; when he invited Lockhart to London his offer was £1000 a year, which could be made £2000 by contributions. In seven years, the profits of which would not be worth less than £1500 per annum. Besides Scott and Southey, George Ellis, Heber, Barrow, Croker, and Captain Head were considerable contributors. Croker had 89 articles in Murray's number. A frequence rate of payment to Scott and Southey was £100 per article. The fashion of the times, and the lighter monthlies, have told against the Quarterly, which still commands, however, the best ability and scholarship in England. See Smiles, A Publisher and his Friends (2 vols. 1891), and articles BOOK-TRADE, MURRAY (JOHN), and PERIODICALS.
Quartenn is a term employed in some parts of Great Britain to designate the fourth part of a peck; in liquid measure it is the fourth part of a pint, and so synonymous with the imperial gill. A quartenn loaf generally weighs 4 lb.

Quarter Sessions, a county court; Justices of the Peace were established in 1530-51, and meeting once a quarter. Most of their administrative duties were in 1888 transferred to the County Councils (see County).

Quarterstaff, once a favourite weapon with the English for hand-to-hand encounters, and still sometimes used in athletic exercises, is a stick, of wood, iron, or about 6 ft. long, often bound with iron at both ends. It is grasped in the middle by one hand, the other holding halfway between the middle and end (hence apparently the name ‘quarter-staff’); and the attack is made by giving it a rapid circular motion, which is the loaded ends on the adversary at unexpectcd points. See Broadsword and Singleton, by Allanson-Winn and Philippi-Wolley (1890).

Quartet, a piece of music arranged for four solo voices or instruments, in which all the parts are obligato—i.e. no one can be omitted without incurring the effect of the disposition. More intercalation of melody, by which the parts become in turn principal and subordinate, without any interweaving of them, does not constitute a quartet. Quartets for stringed instruments are generally arranged for two violins, viola, and violoncello, and are known by sonata form. They originated with Haydn, and were further developed by Mozart, and notably by Beethoven, who perfected the art of part-writing. Subsequent writers are Schubert, Spohr, Mendelssohn, Schumann, and Brahms. Vocal quartets are a frequent feature in oratorio, oratorio, and up to the time of the meeting of Wagner.

Quartodecimus. See EASTER.

Quartz, a mineral composed of silica, SiO₂. It is met with chemically pure, but not infrequently contains variable proportions of ferric oxide, manganese oxides, alumina, magnesia, lime, organic matter, &c. Very often it shows inclusions, microscopic or macroscopic as the case may be, that render it difficult to distinguish from cavities. It occurs both in crystals and massive, the more common crystals being hexagonal prisms terminated by hexagonal pyramids. Double hexagonal pyramids are also not uncommon. It scratches glass easily, and becomes positively electrical by friction. Fine inclusions are mere tremulous giving luminescent in the dark. Quartz when pure is colourless, but, owing to the presence of foreign substances, many coloured varieties are known. Three types of quartz are recognised: (1) Rock-crystal, (2) Common Quartz, and (3) Compact Quartz.

Rock-crystal.—Under this head are included the varieties which are more or less transparent and assume well-marked crystalline forms. The water-clear crystals are known as Rock-crystal. The crystals are sometimes slender, crossing and penetrating each other in exquisite groups. They frequently enclose other substances, which are beautifully seen through the transparent rock-crystal, as slender hair-like or needle-like crystals of hornblende, asbestos, oxide of iron, rutile or oxide of titanium, oxide of manganese, &c., and small specks of various fanciful names, as Thetis’ Hair-stone, Venus’ Hair-stone, Venus’ Pensée, Cupid’s Net, Cupid’s Arrows, &c.; and sometimes the enclosed substances are small spangles of iron-glance, or crystals of iron pyrites, or native silver in fern-like leaves, or spangles of gold. Rock-crystals are found in large quantities in the quartz of Poreta. Very large crystals of perfectly pure rock-crystal are sometimes found.

One from the Alps, which was among the treasures carried from Italy by the French in 1797, is 3 feet in length, about 1½ feet in diameter, and weighs 7 cwt. Similar giant crystals are obtained in Madras. Rock-crystal was once used as a substitute for topaz and was used by them, as it still is, for vases, cups, seals, &c. An important modern use of it is for lenses of spectacles, &c., its hardness rendering it much less liable to be scratched than glass. Lenses of rock-crystal are often called Pebble lenses. Rock-crystal is best developed in the crevices and cavities of crystalline schistose and granitoid rocks, such as those of Tyrol and the Alps, where it is associated with felspar, titanite, rutilc, mica, chlorite, and other crystallised minerals. Smoky Quartz, smoky-brown; Caurin- quartz, smoky-yellow; and Morion, blue, are varieties the colours of which have been variously attributed to the presence of small quantities of oxide of iron or manganese, or titan acid or organic substance. Yellow and pellucid varieties of rock-crystal are known as False Topaz. Amethyst (q.v.) is a purple kind of quartz; and Rutile Quartz is purple or violet, the darker shades are often highly prized; sometimes speckled varieties of this beautiful mineral occur. When subjected to heat amethyst loses its violet colour and becomes yellow. The Gold Topaz and Citrine of jewellers are in most cases amethysts which have been treated in this manner.

Common Quartz includes non-transparent varieties, some of which, however, are more or less translucent. They are either white, colourless, or coloured, the tints being generally pale, but many show intense shades of red, green, yellow, brown, &c. Sometimes they assume crystalline forms, at other times they have a granular or massive structure. The following are varieties: Milk-quartz, milk-white and slightly opaque (Greenland, &c.); Grassy Quartz, like milk-quartz, but with a greenish lustre; Rose-quartz, rose-red, sometimes crimson, the color fading on exposure (Bodemenai); Siderite or Sapphire-quartz, indigo or blue in colour, from the presence of asbestos-like fibres of blue crocidolite (Golling in Salzburg); Ferruginous Quartz, coloured red with ferric oxide or brown with hydrons ferric oxide; Prase, leek and other varieties; the oxide of titanium and mica, Quartz containing the quartz whithish or coloured eectric radiations (Bohemia); Fibrous Quartz, brown, with a silky lustre, pseudomorphous after crocidolite (Cape of Good Hope); Quartz-pyrite is an olive-green aggregate of quartz and pyrite (Saxony, &c.); Star-quartz, containing within the crystal whitish or coloured eccentric radiations (Bohemia); Fibrous Quartz, brown, with a silky lustre, pseudomorphous after crocidolite (Cape of Good Hope); Quartz-pyrite is an olive-green aggregate of quartz and pyrite (Saxony, &c.); Floatstone, porous, cavernous, which floats in water until the air in its numerous cavities becomes displaced (Cornwall, &c.); Cat’s-eye, yellow or greenish, exhibits opalescence, but without prismatic colours, an affect due to fibres of asbestos or minute tubes arranged in parallel directions (Ceylon, Harz, Fichtelgebirge, &c.).

Compact Quartz embraces compact and also finely granular aggregates, which are only translucent on their edges. Varieties are Hornstone, grey, brown, yellow, or red, common in many countries; Chrysozoa, a hornstone coloured green with nickel (Silesia); Aventurine (q.v.), a somewhat granular hornstone, spangled with scales of mica or goethite (Alta Mountains); Jasper (q.v.), brown, yellow, red, very impure, with a considerable percentage of iron.

Among the synthetic minerals which are included in the quartz family are the chalcedonies. These are mixtures of crystalline and amorphous silica. Chalcedony (q.v.) itself is colourless or pale gray, or pale bluish or yellowish, translucent to semitransparent. It is often seen in mammillari, botryoidal, or stalactic forms. The following are chalcedonies: Carnelian,
clear red and sometimes yellowish; Plasma, green; Heliotrope or Bloodstone (q.v.), green with red spots. Chalcedony is a dull milk-white and sometimes porphyritic rock, but is regarded by some mineralogists as a variety of Opal. *Mass-agate* is a colourless chalcedony, containing brown moss-like dendritic inclusions. Agate (q.v.) consists of alternate layers of chalcedony and other varieties of crystalline and amorphous silica. *Onyx* is a highly polished layer of black or brown and white chalcedony; while in Sardonyx, which has a similar structure, the alternate layers are red and white. For amorphous forms of silica which contain variable quantities of water, see Opal.

Quartz is the most abundant and widely diffused of all rock-forming minerals. It occurs in many other igneous and schistose rocks it is met with in a less prominent constituent. It occurs also abundantly as a secondary mineral or alteration-product in igneous and schistose rocks generally—sometimes irregularly diffused, at other times occupying crevices, cavities, &c. Many rocks, especially Archean and Palaeozoic, are composed of quartz, which may vary in breadth from mere lines up to many feet. In some places such veins are more or less impregnated with gold—indeed quartz veins may be looked upon as the chief repositories of the precious metal (see Gold).

Quartz, in crystals, is also one of the most common minerals met with lining the walls of metallic lodes. Amongst derivative rocks it plays an important part—conglomerates and sandstones being composed as a rule chiefly of siliceous materials. Chalcedony as a rock constituent is a product of alteration, and is met with commonly in the vessels and pores of many igneous rocks, or as irregular aggregates diffused through their ground-mass. It is also a common vein-mineral—the coloured chalcedonies especially occurring in this form. Agates occur in veins, and especially in the amygdule cavities of igneous rocks.

**Quartz-porphyry,** an igneous rock, consisting of crystals of quartz and felspar scattered porphyritically through a compact or very finely crystalline ground-mass of the same minerals. It occurs both in the intrusive rock and in the form of layers which have flowed out at the surface. Some of the quartz-porphyries which have a very compact or microfelsitic ground-mass appear to have been originally volcanic vitreous rocks—the glass having subsequently become devitrified. The non-porphyritle varieties which have a flinty or hornstone-like aspect are called *Felsite* (q.v.). *Quartzers-porphyry* is a name for Orthoclase-porphyry (q.v.).

**Quartz-rock, or Quartzite,** is a commonly occurring rock, composed of an aggregate of quartz-grains welded together. It is usually white, gray, or rusty yellow or reddish in colour, and has a splintery fracture. Under the microscope the grains show a rounded and often semi-fused appearance, as if they had been mutually amalgamated while in a softened condition. The siliceous paste in which the granules are frequently set has usually a crystalline texture, and now and again crystals of quartz are developed in it. The rock not infrequently occurs in strata of variable thickness, often forming mountain-masses. Sometimes it assumes a foliated structure (*Quartz-schist*), and contains scales of mica which occasionally form layers or laminae. The rock is obviously of sedimentary origin, and has subsequently been subjected to metamorphic action.

**Quartz-trachyte.** See *Liparite.*

---

### Quaternary

**Quasimodo Sunday.** See Low Sunday.

**Quassia,** a genus of trees and shrubs of the natural order Simarubaceae (q.v.); having hermaphrodite flowers, with five petals combined into a tube, and much longer than the small calyx, ten stamens, five germens, and only one style; the fruit composed of five drupes. *Quassia emarginata* is a native of the tropical parts of America and of some of the West India Islands. It is a shrub 10 to 15 feet high, with racemes of bright-red flowers, and large pinnate leaves, which are remarkably winged and jointed. The wood, and particularly that of the root, has a strong, purely bitter taste, and was at one time much used in medicine under the names of *Quassia-wood,* Bitterwood, &c. The flowers were valued in Surinam for their stomachic properties as early as the beginning of the 18th century; the wood of the root began to be known in Europe before the middle of that century, and was more fully brought into notice about 1756, by Rolander, a Swede, who had visited Surinam, and had learned its value from a negro, called Quass, Quasha, or Quacy. This negro had discovered it about 1730, and had employed it with great success as a remedy for fevers, so that though, as Rolander says, a very simple man, he had acquired a great reputation by his use of it. Linnaeus published a dissertation on it in 1761, and it was he who gave the genus its name *Quassia,* from the name of the slave by whom its medicinal qualities had been made known. The true quassia is now, however, little used; its name having been transferred to the Bitterwood (q.v.) of the West Indies, *Picrena* (or *Quassia*) excedens, a lofty tree, the wood of which possesses the same properties, although in an inferior degree; but this inferiority is compensated by the greater facility with which any requisite supply is obtained. It is the wood of this tree which is now sold as *Quassia-wood,* or Quassia-chips, in the colonies. It is used to a considerable extent instead of hops for making beer, although the use of it is illegal in Britain, and beer made with it is said to become muddy and flat, and not to keep. Quassia-wood is very feebly narcotic, and a decoction of it is used for killing flies. Cabinet-work made of it is safe from all attacks of insects. In medicine it is a valuable stomachic tonic; but in fevers it is not to be compared either in efficacy with cinchona and its alkaloids. Its properties depend on a bitter principle called quassin, C_{19}H_{28}O_{7}, which is present in minute amount in the wood.

**Quaternary,** or Post-Tertiary, the fourth great division of the fossiliferous strata, which embraces the Pleistocene (q.v.) or Glacial and Post-glacial (q.v.) and Recent systems.
Quaternions (or 'sets of four'), the name of a calculus of peculiar power and generality invented by Sir William Rowan Hamilton (q.v.) of Dublin. As a geometry, it primarily concerns itself with the operations by which one directed quantity or Vector (q.v.) is changed into another. Such an operation is called a quaternion, for reasons which will appear hereafter. From this point of view alone we shall discuss it here. We assume the law of vector addition, which asserts that the vector or directed line AC (see fig. 1) is equal to the sum of the vectors AB and BC, or any other directed lines parallel and equal to them. For example, the resultant of two velocities or coterminal forces is a vector equal to the vector sum of the components (see Composition). Quantities which do not involve the idea of direction or directedness are called Scalars; such are the quantities used in arithmetic and ordinary algebra. Parallel vectors can all be represented as scalar multiples of one another, or (better) of the parallel vector whose length is unity. By the latter representation, the scalar multiple gives the length or tensor of the vector. Thus any vector \( \mathbf{a} \) may be factorised into its tensor and directed unit part. This is symbolised by the equation \( \mathbf{a} = T \mathbf{U} \), where \( T \) and \( U \) appear as selective symbols of operation, separating out the length and direction respectively.

The operation which simply rotates a vector into a new direction without changing its length is a particular kind of quaternion called a Versor. A second application of this versor produces an exact equal rotation in the same plane—i.e. about the same axis. With this versor, therefore, are associated an axis having a definite direction and an angle through which any vector perpendicular to this axis is rotated by the versor operating on it. A very important case of the quadrantal or right versor, which turns a perpendicular vector through a right angle. Let \( \mathbf{i} \) represent the right versor whose axis is perpendicular to the plane of the paper. Then (fig. 2) if \( \mathbf{\beta} \) is any vector in the plane of the paper, the quantity \( \mathbf{i} \mathbf{\beta} = \gamma \) gives a vector perpendicular to \( \mathbf{\beta} \) and to the axis of \( \mathbf{i} \). A second operation gives

\[ i\beta = \gamma \beta = i\gamma = -\beta, \]

or symbolically \( i^2 = -1 \). The square of any right versor is negative unity. It is easy to show that \( i, \) where \( \mathbf{i} \) is a scalar, is an operator which still turns any appropriate vector through a right angle, but at the same time increases its tensor \( n \) times. Such an operator is a quadrantal quaternion, whose tensor is \( n \) and versor \( i \). A quaternion can always be factorised into its tensor and versor parts.

Now let \( O, \mathbf{O} \) (fig. 3) be the axes of two right versors \( i \) and \( \mathbf{1} \), making angle \( \theta \) with each other. Describe the sphere of unit radius with \( \mathbf{O} \) as centre, and draw the vector \( \mathbf{O}A \) or a perpendicular to \( \mathbf{i} \) and in the plane \( \mathbf{O} \mathbf{1} \). Draw \( \mathbf{O}B \) or \( \mathbf{B} \) perpendicular to \( \mathbf{i} \) and \( \mathbf{1} \)—i.e. upward from the plane of the paper; and finally draw \( \mathbf{OC} \) or a perpendicular to \( \mathbf{1} \) and \( \mathbf{B} \). Then first \( \mathbf{1} \mathbf{1} = \mathbf{\beta} \) and secondly \( \mathbf{1} \mathbf{i} = \mathbf{\beta} = \gamma \), so that \( \mathbf{i} (\gamma = \gamma /a) \) is a versor which rotates a into the position \( \gamma \). This versor has its axis parallel to \( \mathbf{O} \mathbf{B} \), and its angle equal to the complement of \( \theta \). Thus any versor can be represented by the product of two right versors perpendicular to it and making with each other the appropriate angle. If the two right versors are themselves at right angles, their product becomes the right versor perpendicular to both. We thus arrive at what is historically the basis of quaternions—viz. Hamilton's remarkable system of universally perpendicular right versors \( ij \). As operators (see fig. 4) they are connected by the equations

\[ \mathbf{i} \mathbf{j} = k = -ji \]
\[ \mathbf{j} \mathbf{k} = i = -kj \]
\[ \mathbf{k} \mathbf{i} = j = -ik \]
\[ \mathbf{i} \mathbf{k} = -1 = \mathbf{j}^2 = \mathbf{k}^2. \]

The special point to notice is the non-commutative character of the process of multiplication, \( \mathbf{i} \mathbf{j} \) not being the same as \( \mathbf{j} \mathbf{i} \).

The discovery of the equation \( \mathbf{i} \mathbf{j} = -\mathbf{j} \mathbf{i} \) on October 16, 1843, was quickly followed by the development of the whole calculus of quaternions. Now, if \( \mathbf{i}, \mathbf{j}, \mathbf{k} \) be any three vectors instead of right versors, the equation \( \mathbf{i} \mathbf{j} = -\mathbf{j} \mathbf{i} \) would still be true as an equation of operations. In fact, as is capable of easy proof, right versors obey the law of vector addition; and in the identification of unit vectors and right versors, or more generally of vectors and right quaternions, lies one of the great simplifications of the calculus. Thus the versor \( \mathbf{i} \mathbf{j} \mathbf{k} \) is a right quaternion whose axis (see fig. 4) is along the diagonal of the square of which \( \mathbf{i} \) and \( \mathbf{j} \) are the sides, and whose tensor is equal to the length of this diagonal.

The following conclusions are readily come to. The square of every unit vector is negative unity; the product of two parallel vectors is minus the product of their tensors; the product of two perpendicular vectors is a third vector perpendicular to both and having its tensor equal to the product of the tensors of its factors; the product of any two unit vectors in general a versor; the product of any two vectors is a quaternion whose tensor is the product of the tensors, and whose versor is as mentioned in the preceding sentence. The quaternion \( \mathbf{a} \mathbf{b} \) transforms \( \mathbf{b} \) into the vector \( \mathbf{a} \); and \( \mathbf{b} \mathbf{a} \), being itself a quaternion which undoes the effect of the right quaternion \( \mathbf{b} \), must also be a right quaternion—i.e. a vector. In fact, \( \mathbf{b} \mathbf{a} \) is always equal to a scalar multiple of \( -\mathbf{b} \). Hence the quaternion \( \mathbf{a} \mathbf{b} \) is the operator which changes the vector \( \mathbf{b} \mathbf{a} \) into the vector \( \mathbf{a} \).

This operation involves four numbers: first, the change of length; second, the angle through which the one vector must be rotated so as to bring it into parallelism with the other; and third and fourth, the two numbers necessary to fix the aspect of the plane in which the rotation takes place, or the direction of the axis about which rotation takes place. Thus a quaternion, in general, depends on four numbers, whence the name. A vector or quadrantal quaternion is a degenerate quaternion.
involving only three numbers; while a scalar, which might be defined as the quaternion which changes one vector into a parallel one, is still more demonstrative. On this basis only one number—viz. itself.

There is still one very important representation of a quaternion to consider. This is done most simply as follows: Let $a\beta$ be the two vectors $OA$, $OB$ (fig. 5). Resolving $\beta$ along and perpendicular to the plane $OM$, we get $\beta = OM + ON$; and hence $a\beta = OA.OM + OA.OM$.

But $OA.OM$, being the product of two parallel vectors, is minus the product of the lengths or tensors. On the other hand, the product $OA.OM$, being the product of two perpendicular vectors, is a vector perpendicular to the plane of the paper with tensor equal to twice the area of the triangle $OAB$. Thus the quaternion $a\beta$ is equal to the sum of a scalar and a vector; and generally for any quaternion ($g$) we have the relation

$$g = S.q + V.q,$$

where $S$ selects the scalar part and $V$ the vector part. The geometrical meanings of $S$ and $V$ operating on $a\beta$ are easily seen to be these—

$$S.a\beta = - TaT^3 \cos \theta, \quad V.a\beta = iTaT^3 \sin \theta,$$

where $i$ is the unit vector perpendicular to $a$ and $\beta$.

We end with a few illustrations. Thus, if $a$ is a constant vector, and $r$ a variable vector, the equation $S.a = c$, a constant, means that the resolved part of $r$ along the direction of $a$ is constant, and that therefore the extremity of $r$ traces out a plane perpendicular to $a$. The versor that turns any line through an angle $\theta$ in a given plane has the form $\cos \theta + i \sin \theta$, where $i$ is the right versor perpendicular to that plane.

De Moivre's theorem (see DEMOIVRE) at once follows if we write $i = \sqrt{-1}$. Finally, if $\beta$ represents a force acting at the extremity of $a$, $V.a\beta$ is the vector moment of the force about the origin; and in the almost self-evident equation

$$V.a(\beta - \beta') = V.a\beta + V.a\beta',$$

we have a completely general demonstration of Varignon's theorem of moments. See MOMENT.

Hamilton's Lectures on Quaternions (1853) and his Elements of Quaternions (1866) are still the classical works on the subject. Tait's Elements of Quaternions (3d ed. 1890) is probably better fitted as a textbook for the student to work through, and contains some original applications of high physical interest. Kelland and Tait's Introduction to Quaternions (1874) may be recommended to the beginner. Tait's treatise has been translated into French and German.

Quatre-Bras, a village of Belgium, about 10 miles SSE. of Waterloo, situated at the intersection of the great roads from Brussels to Charleroi, and from Nivelles to Namur, whence its name ("four arms"). On 16th June 1815, two days before the battle of Waterloo (q.v.), Quatre-Bras was the scene of a desperate battle between the English under Wellington and the French under Ney. The honours of the field remained with the former; but the severe defeat of Bliicher the same day at Ligny compelled Wellington to retreat. The battle on the English side was 32,000, on the French 41,400, amongst the Allies being the Duke of Brunswick, the gallant chief of the Black Brunswickers. A monument to his memory, a bronze lion 103 feet high, was erected in 1890.

Quatrefages, Jean Louis Armand de, a naturalist, was born at Berthezé (Yonne) on 10th February 1810, studied medicine at Strasburg, and in 1838 was appointed professor of Zoology at Toulouse. But this post he soon resigned and went to Paris, to study further for himself. In 1850 he was elected professor of Natural History in the Lyceé Napoléon, and in 1855 of Anatomy and Ethnology at the Natural History Museum in Paris. He devoted his attention principally to anthropology and the lower animals, especially annelida, and his chief works are L'Espece Humaine (1877; 5th ed. 1886; Eng. trans. 1879); Souvenirs d'un Naturaliste (1854; Eng. trans. 1857); Unité de l'Espece Humaine (1861); Crania Ethnica (1875-82); La Race Prussienne (1879; Eng. trans. 1872); Les Pygmées (1887); Histoire Naturelle des Annuâlés (2 vols. 1886); Dictionnaire des Français (1892); and Théories Transformistes (1892). He died 13th January 1892. See ANTHROPOLOGY.

Quatrefoil, an opening in tracery, a panel, &c., divided by cusps or featherings into four leaves. This form is much used as an ornament in Gothic architecture.

Quatre-Mère, ÉTIENNE MARC, a French orientalist, was born in Paris, 12th July 1782, and from his earliest childhood to his latest years, immersed in inestimable study; he lived more after the fashion of a medieval recluse than a modern scholar. Employed in 1807 in the manuscript department of the Imperial Library, he was promoted in 1809 to the Greek chair in the College of Rouen, and in 1819 to the chair of Ancient Oriental Languages in the Collège de France, and in 1827 he became professor of Persian in the School for Modern Oriental Languages. He died 18th September 1857. Although a man of vast and accurate knowledge, he had little critical insight or originality. His principal works are Recherches sur la Langue et la Littérature de l'Égypte (1808), proving that the language of ancient Egypt is to be sought for in modern Coptic; Mémoires Géographiques et Historiques sur l'Égypte (1810); Memoire sur les Nabatéens de la Syrie (1819); Récherches des Sultans Mamelouks (1837), from the Arabic of Makrizi; Histoire des Mongols de la Perse (1838), from the Persian of Rashid ed-Din; an edition of the Arabic text of the Prolegomena of Ilmunhaldun; and a multitude of articles scattered through the pages of the Journal Asiatique and the Journal des Savants.

Besides this, he gathered materials for Arabic, Coptic, Syriac, Turkish, Persian, and Armenian dictionaries.

Quattro Cento (Ital., 'four hundred', a contraction for one thousand four hundred; cf. CINQUE CENTO), in Italian a term for the 15th century, its literature and art; the early Renaissance. Outstanding Quattrocentisti in art are Donatello, Della Robbia, Brunellesco, Masaccio, Ghirlandajo, Lippo Lippi, and Mantegna.

Quebec, a province of the Dominion of Canada, lies to the east of Ontario, and between that province and New Brunswick. Deducting the surface of its inland waters, including the River and Gulf of St. Lawrence, the area of Quebec, including recent additions, is 347,530 sq. m. The surface of the country is varied and grand, consisting of extensive rivers and lakes, large stretches of agricultural land, and immense forests. Two ranges of mountains run through the province from southwest to north-east, that on the south side of the St. Lawrence being called the Notre Dame or Green Mountains, stretching from Quebec to Gaspe, while on the north side of the river is the Laurentian Range (see CANADA). The chief river in the
Province is of course the St Lawrence (q.v.), which has many tributaries of great length, the principal being the Chaudière, the St Maurice, and the Saguenay. The influence of the tide in the St Lawrence is felt as far up as the town of Three Rivers, which is nearly 900 miles from the Straits of Belle Isle. Several of the rivers are navigable for the greater part of their course, while others are used in floating timber and building supplies, manufacturing industries with almost unlimited water-power. There are numerous lakes in the province, of which the best known are Temiscamingue, Metatapia, Temiscowata, Memphremagog, and St John. The province has a coast-line of 825 miles on the Atlantic. 

The climate of Quebec is very much like that of the other parts of eastern Canada, excepting perhaps that the winter is slightly colder; but, as in Ontario, and in the maritime provinces, the air is generally dry and brilliant, the cold is not felt to be unpleasant, and it is no disadvantage to either the agricultural or other industries; in fact, the climate is exceedingly healthy. The soil of the province is rich and loamy, well adapted for the growth of products of all kinds. Cereals, hay, and root-crops grow everywhere in abundance. Indian corn, hemp, flax, and tobacco are also raised in many parts of the province. Fruit in considerable quantities is grown, especially apples and plums, which are exported largely. Small fruits are very abundant, and grapes ripen in the open air in many districts. Tomatoes are also a field-crop. Cape-breeding on a large scale was carried on, and many thousands of animals are exported to Great Britain yearly. For pasturage the land of Quebec is of special excellence, particularly in the eastern townships and north of the St Lawrence. 

The fisheries in the River and Gulf of St Lawrence are very prolific, and all the smaller rivers teem with fish. Along the St Lawrence especially this industry is an important one. The value of the fisheries is over $2,000,000 annually. The province is notably rich in minerals. Alluvial gold is found in various places, copper is found in the eastern townships, while iron is very generally distributed. Other minerals, such as lead, silver, platinum, and zinc, are also found, while the asbestos deposits, and those ofapatite, or phosphate of lime, have achieved a reputation far beyond the limits of the province. Agriculture and dairy-farming form the chief occupations of the people at present, but manufactures, the fisheries, and commerce employ a considerable part of its inhabitants, as do also lumbering, mining, and shipbuilding. The principal articles manufactured are cloth, linen, furniture, leather, sawn timber, flax, iron and hardware, paper, chemicals, sugar, soap, india-rubber goods, boots and shoes, cotton and woollen goods, cheese (there were 672 cheese-factories and creameries in 1891), and ferries.

Quebec has nearly 3000 miles of railway in operation, besides important canals, such as the Lachine, Beaumanoir, and Chambly. A great portion of the total area is covered with timber, chiefly red and white pine, the hardwoods, however, forming one-third of the total exports of the province. The other principal exports are animals and their products and agricultural and dairy produce, amounting altogether to about $60,000,000 annually, the greater proportion going to Great Britain. The imports reach nearly $3,000,000, the largest coming from Great Britain. The revenue in 1897 amounted to $3,837,466, the expenditure to $4,892,282, and the provincial debt to $21,718,476. The revenue is derived from the saldcentration from the Federal treasury, receipts from land sales, timber limits, mines, licenses, and certain other direct taxes.

The area of the province is represented in the Dominion Senate by 24 members, and in the House of Commons by 65 members. The population consists largely of French-Canadians, descendants of the French settlers living in the country when it was transferred to Great Britain in 1763. The population in 1881 was 807,627, of which 707,024, or 87 per cent, of the total, were French, 123,749 Irish, 81,515 English, and 50,923 Scotch. In 1891 the total population was 1,488,886. In 1873, at the time of the session, the French population did not exceed 80,000, so that the progress in less than 130 years has been very remarkable, and in strange contrast to the state of things in old France. Families of twelve and fourteen are quite common amongst French-Canadians. The English population does not increase in the same way.

The French-Canadian language is still used in the province, and is sanctioned by law; the same remark applies to the French law. It is generally supposed that these privileges were conferred upon the French Canadians by act of the Act of 1867, with the provinces of Canada. 

Quebec is the capital of the province of the same name, is situated on a steep promontory on the north bank of the St Lawrence at its junction with the St Charles River, 300 miles from the mouth of the St Lawrence and 180 miles below Montreal (172 by rail). The highest part of the headland is Cape Diamond, 333 feet above the level of the
QUEBEC

Quebec is the most important military position in Canada. The citadel occupies an area of 40 acres, and commands a magnificent view. The harbour is spacious, and the docks and other buildings are proof of engineering skill. On the Levis side of the river is the extensive grazing- dock. The city is divided into an Upper and Lower Town. In the latter are situated the banks, warehouses, and wholesale and retail stores. In the Upper Town are the city records, houses of business, buildings, churches, gardens, and retail shops. Towards the west are the thriving suburbs of St John, St Louis, and St Roch's. The last named has become a place of commercial importance, with its immense warehouses and stores. To the south-west of St John are the Plains of Abraham, the historic battlefield, where a column 40 feet high has been erected to the memory of General Wolfe. Another monument, 65 feet high, dedicated to Wolfe and Montcalm, is situated in the Governor's Garden, and immediately overlooks the St Lawrence. On the St-Peyre Road is an iron pillar crowned by a bronze statue, commemorating the deeds of the British and French under Murray and Levis in 1760. There is a shaft also to the memory of Cartier and the Jesuit Brebeuf. In 1898 a statue to Champlain (q.v.), founder of the city, was unveiled by the bishop of Quebec. In the city hall is Dufferin Terrace, 1400 feet long, commanding a noble view. The Grand Battery is also picturesque situates. Three handsome modern gates have replaced the old gates. The principal edifices are the parliamentary and departmental buildings, courthouse, post-office, custom-house, city hall, masonic hall, basilica, the archiepiscopal palace, the Anglican Cathedral, Church Hall, and Young Men's Christian Association building. Laval University, named after the first Roman Catholic bishop of Montreal in 1663 for his services to the education of the province, is an important institution, holding two charters, one from Queen Victoria (1852) and the other from Pope Pius IX. The building is spacious, well equipped, and contains a library of 90,000 volumes, a museum and art gallery, laboratory, &c. The faculties are theology, law, medicine, and arts. The annual seminary is a department of the faculty of theology and philosophy. Other Roman Catholic halls of instruction are Laval Normal and Model School, the Ursuline Convent, the College of the Good Shepherd, and Laval College. The College of Presbyterians, affiliated with McGill University, is situated at the foot of the mountain, and is the most noted of the schools. They have a number of students, and their college is well equipped. The city has also a large number of institutions for the benefit of the poor and infirm, including a hospital for the insane, and a school for the deaf and dumb. The newspapers are published in French and English. The supply of water is continuous and good, and comes from Lake St Charles. The city is lighted with gas, and electricity, the power for the latter being afforded by the Falls of Montmorency, 9 miles distant.

Quebec is connected with all the cities in America by various lines of railway, and is at the head of ocean steamship navigation to Europe. Slipways and docks, the result of the industrial prosperity of late years, are on the waterfront. The principal manufactures are worsted goods, iron-castings, machinery, carriages, cutlery, nails, leather, musical instruments, boots and shoes, paper, tobacco, steel, &c. The chief exports are tobacco, fish, and flour. The city has suffered from disastrous fires, which have led to improvement by the re-erected of finer buildings. The city elects three members to the Canadian House of Commons and three members to the Quebec House of Assembly. Quebec is the seat of the Roman Catholic cardinal-archbishop and the see of the Anglican bishop. It was originally called Stadacona, and was visited by Cartier in 1535. In July 1608 Champlain received the laying on of hands at the present name. It continued to be the centre of French trade and civilisation, as well as of the Roman Catholic missions in North America, till 1759, when it fell into the hands of the British (see Wolfe). In 1783 it was ceded to Great Britain by the treaty of Paris, and in 1801 (see British North America Act 1867). Quebec is 62,446; (1891) 63,000; in 1898 to the city proper was annexed the suburb of St Sauveur, with its population of 15,000.

QUEEN

Quebec is the city of Aspidoesperma quebracho (natural order Apocynaceae), which grows in the Argentine Province. It has a slightly bitter taste, and contains a number of active principles, of which the most important is aspidospermine. Both the bark and aspidospermine act like quinine in lowering the temperature in some cases of fever. They promote secretion from the kidneys, intestinal and salivary glands, and relieve dyspepsia or asthma of functional origin. The liquor is taken in doses of five to eight grams, aspidospermine in doses of one gram per day.

Quedlinburg, a town of Prussia, at the northern base of the Harz Mountains, 56 miles by rail SE. of Brunswick. Founded by Henry the Fowler in 924, it is still in part surrounded by a wall flanked with towers. On an eminence overlooking the town stands the castle, which is prior to the Reformation the residence of the archbishops of Quedlinburg, who were independent princes of the empire, and had a vote in the diet, and other privileges. The castle chapel contains monumental tombs of Henry I., his wife Matilda, and the Countess of Königsmark. Here Kluspeck and Karl Ritter were born. The town has manufactures of sugar, wire, goods, and farinaceous foods, and gardening is prosecuted on an extensive scale. (Pop. (1890) 20,761.

Queen (A.S. cwfn, 'a woman', cognate with Dutch kweven, Ice. kvain, Gr. γυνή, Sansk. janti), in its primary significance, has in all ages been invested with privileges not belonging to other married women. The English queen, unlike other wives, can make a grant to her husband, and receive one from him. She can sue and be sued alone, and purchase land without the king's concurrence. The Statute of Treasons makes it treason to compass her death, or to violate her chastity, even with her consent, and the queen consenting is herself guilty of treason. If accused of treason, the queen is tried by the peers of the realm. The queen-consort is exempt from the civil law and is not subject to any court. She has a Household (q.v.) of her own. It has been the usual practice to crown the queen-consort with solemnities similar to those used in the coronation of the king. In the case of Queen Caroline, consort of George IV., the ceremony was never performed. Certain rents or revenues were anciently appropriated to the income of the queen, but no separate revenues seem ever to have been settled on any queen-consort by parliament. Her personal expenses are defrayed from the king's privy purse, and are not assessable. The queen-dowager is the widow of the deceased king. She retains most of the privileges which she enjoyed as queen-consort, nor does she lose her dignity by re-marriage; but it has been held that no one can marry the queen-dowager without...
permission from the king, on pain of forfeiture of lands and goods. On the marriage of a king, or accession of an unmarried prince, parliament makes provision for the queen’s maintenance, in case of her regency.

The queen-regnant is a sovereign princess who has succeeded to the kingly power. In modern times, in those countries where the Salic law does not prevail, on failure of males a female succeeds to the throne. By an act of Queen Mary, the first queen-regnant in England, it was declared ‘that the regal power of this realm is in the queen’s majesty as fully and absolutely as ever it was in any of her most noble progenitors kings of this realm; and it has since been held that the powers, prerogatives, and dignities of the queen-regnant differ in no respect from those of the king. The husband of the queen-regnant is her subject; but in the matter of conjugal indissolubility he is not subjected to the same penal restrictions as the queen-consort. He is not endowed by the constitution with any political rights or privileges, and his honours and precedence must be derived from the queen. The Prince Consort was naturalised by 3 and 4 Vict., words being used which enabled him to be a privy-councillor, and sit in parliament; but it was provided that His Royal Highness was not, by surviving of his wife, to become any interest in the property of Her Majesty. By a decree of the Queen, Prince Albert enjoyed place, pre-eminence, and precedence next to Her Majesty.

**Queen Anne’s Style.** See RENAISSANCE.

**Queen Anne’s Bounty.** The name given to a fund appropriated to increase the incomes of the poorer clergy of England, created out of the first-fruits and tithes, which before the Reformation formed part of the papal exactions from the clergy. The first-fruits are the first whole year’s profit of all spiritual preeminents, and the tithes are one-tenth of their annual profits, both chargeable according to the ancient declared value of the benefice; but the poorer livings are now exempted from the tax. Henry VIII., on abolishing the papal authority, annexed the first-fruits and tithes to the crown; and, by an act passed in 1703, these revenues were set aside, with the consent of Queen Anne, to form a perpetual fund for the augmentation of poor livings. The Archbishops, Bishops, and Masters of the Rolls, Privy-councillors, Lieutenants and custodes rotulorum of the counties, the Judges, Queen’s Serjeants-at-law, Attorney- and Solicitor-general, Advocate-general, Chancellors and Vice-chancellors of the two Universities, Lord Mayor and Aldermen of London, and mayors of the several cities, and by supplemental charter the officers of the Board of Green Cloth, the Queen’s Council, and the four Clerks of the Privy-council were made a corporation by the name of ‘The Governors of the Bounty of Queen Anne for the Augmentation of the Maintenance of the Poor Clergy,’ and to this corporation was granted the revenue of first-fruits and tithes. The governors’ grants consist of capital sums of £200 to meet benefactions of money, land, tithe, rent-charges, stipends, &c., of equal value, out of which not exceeds £200 in any annual income. A benefaction may be offered and a grant sought either for the augmentation of the endowment of a benefice, or towards the cost of providing or improving a parsonage-house, &c. The application of the funds at the disposal of the governors is supervised by the Bishop of London and subject to all statutory provisions. The annual revenue in 1890 was £176,896. See Crispe, Laws of the Church and Clergy.

**Queen Anne’s Earthing.** See FARTHING.

**Queensborough, a village on the Isle of Sheppey, Kent, 2 miles S. of Sheerness, was founded by Edward III. (1359), and named after Queen Philippa.** A line of steamers sail daily between Queensborough and Flushing in Holland. Pop. 982.

**Queen Charlotte’s Islands, a group to the north of Vancouver Island, off the coast of British Columbia. Area, 5100 sq. m. The two principal islands, Graham and Moresby, have a length of 160 and a greatest breadth of nearly 70 miles. The climate is healthy, but very rainy. Anthracite coal, copper and iron ore, and gold-bearing quartz have been found, and forests abound. The inhabitants are about 2000 Indians, who engage in fishing.**—Queen Charlotte’s Sound is a strait separating Vancouver Island, on the north, from the mainland.

**Queen of the Meadow.** See SPIREA.

**Queen’s Bench.** See COMMON LAW.

**Queen'sberry, William Douglas, Duke of,** ‘Old Q,’ was born in 1724, and succeeded his father as Earl of March, his mother as Earl of Huntington, and his great-grandfather as Duke of Queenberry. He was famous for years as a patron of the turf, and infamous always for his shameless debaucheries. He is said to have displayed great taste in a song, but to-day lives solely through Wordsworth’s indignant sonnet, composed at Nelson, whose venerable trees ‘wait on poor Queen’sberry, who had felled, to spite his heir or to dower one who he flattered himself was his daughter. After long fear of death he died unmarried, worth over a million sterling, on 23rd December 1810, and was buried beneath the communion-table of St. James’s Church, Piccadilly. See Life by J. R. Holborn (1885).

**Queen’sberry Plot.** See LOYAT.

**Queen’s College.** For women (43 to 45 Harley Street, London), was established in 1848, and incorporated by royal charter in 1853. It owed its existence partly to the Governors’ Benevolent Institution and partly to a movement originated by the Rev. G. G. Neidn, and supported by the Rev. F. D. Maurice and other King’s College professors. Its Committee of Education as at first constituted included the names of Maurice, Trench, and Kingsley; of Sterndale Bennett and Hullah; of Ansted and Edward Forbes; of Mulready and Richmond. Its aim is to provide for the higher education of women, in the first place by a liberal school and subsequently by a four years’ course of college education. The college curriculum includes the school for pupils under fourteen years of age, the preparatory class for pupils too old to be admitted to the school but too backward for the first year’s classes in college, and the college course of three years for the training for the grade of ‘associate,’ or six years or more for that of ‘fellow.’ This college is self-supporting, and is at present without any endowment. The students number about 360, and are chiefly day scholars, but boarders are received by authority of the council at two adjoining houses in Harley Street.

See Women’s Rights; the Queen’s College Calendar; Maurice’s Queen’s College; its Objects and Method (1848). Mrs A. Tweedie, The First College for Women (1888).—For Irish Queen’s Colleges, see IRELAND, Vol. VI. p. 292.

**Queen’s Counsel.** See King’s Counsel.

**Queen’s County, an inland county of Leinster, Ireland, is bounded N. by King’s County, S. by Kilkenny, and W. by Tipperary, and measures 87 miles long and 45 miles broad. Its area is 424,554 acres. Pop. (1841) 153,988; (1861) 90,650; (1881) 73,124; (1891) 64,630, of whom 56,743 were Catholics. The number of acres under crop in
QUEEN'S EVIDENCE

1890 was 131,680, and of these 45,312 were under grain-crops (chiefly oats and barley), 36,538 were permanent grass, 30,660 under green-crops (mostly potatoes), and 9,480 were meadow. Nearly 144 per cent. of the total area is barren. Queen's County is, for the most part, within the basin of the Barrow, and is flat and, except where bogs prevail, fertile. It is also drained by the Nore and crossed by the Grand Canal. On the north of the county are the high mountains, Mounts- tains, reaching 1734 feet. Coal occurs in the southeast. Agriculture is the principal occupation; there is much dairy-farming, and a little woollen and cotton weaving. This district was made a shire in honour of Queen Mary, from whom also the chief town, Maryborough (pop. 2972), was called. The antiquities include a round tower and some ecclesi- astical and feudal remains, the most important being a castle on the picturesque rock of Dunama- se. The county embraces two parliamentary districts, each returning one member.

Queen's Evidence. See Approver.

Queensferry, a town of Linlithgowshire, 9 miles WNW. of Edinburgh, on the south shore of the Firth of Forth, is so named by the great Forth Bridge (1892-90; see Bridge, Vol. II. p. 443). Named after St. Margaret (q.v.), it has been a burgh of royalty since 1362, a royal burgh since about 1358, and a police-burgh since 1822; with Stirling, &c. it returns one member. Remains of a Carmelite friary were converted in 1890 into an Episcopal church; and one of its hotels is the Hawes Inn of Scott's Antiquaries. In the neighbourhood are the seats of the Earls of Rosebery and Hopton. Pop. (1841) 1233; (1881) 1966; (1891) 1531.

Queensland. This, the youngest and second largest of the Australian colonies, comprises an area of 668,497 sq. m., representing a country five and a half times the dimensions of the United Kingdom. It was little known until December 1823, when Surveyor-general Oxley, acting on information imparted by two castaway convicts, discovered the river which he named the Brisbane, in honour of the governor of the mother-colony of New South Wales. Queensland was proclaimed by imperial command a separate colony in 1839 under Sir George Ferguson Bowen as first governor. The coast-line is 2250 miles in length. The south-east corner, lying at Point Danger, generally follows the twenty- ninth parallel of south latitude. The northernmost point of the mainland is Cape York; but, since the annexation of the Torres Straits Islands, the limit may be reckoned from the parallel of 10°. Queensland is 1300 miles in length from north to south, and 800 miles at the greatest breadth. The width gradually lessens until, with Cape York peninsula, it assumes a pyramidal outline. Its western boundary for the most part is a straight line, marked by the 138th degree of longitude. Running more or less parallel with the eastern coast is a backbone of mountains, averaging a distance of 50 miles from the sea. Upon its intervening belt settlement has principally taken place. The Main Dividing Range is a continuation of the bolder Australian mountain system, and forms the backbone of New South Wales. The highest peaks are Bellenden-Ker (5500 feet) and Mount Dalrymple (4250). The mean altitude of the range is 2000 feet. The east side is ridgy and thickly timbered with the eucalypt peculiar to the Antipodes. The country west of the mountains is to a large extent open downs and plains, often of the richest black soil, covered with the finest fattening herbage in the world.

Queensland is a fairly watered land. The largest rivers on the east coast are the Brisbane, Mary, Burnett, Fitzroy, Burdekin, and Johnstone. There is also a western watershed, including the rivers Mulgillan, Herbert, and Diamantina. The head- waters of the rivers in all directions, and the mountain ranges, flow through the boundless prairie-country. The rivers Flinders, Leichhardt, Gilbert, Mitchell, and Gregory flow northward to the Gulf of Carpen- taria. The eastern rivers, affording communication from the interior, have assisted in the creation of a great pastoral industry and have also opened up the island-studded coast. Rockhampton is on the Fitzroy, Maryborough on the Mary, and Mackay on the Pioneer. The principal harbour in Queens- land is Moreton Bay, and between it and Thursday Island there are numerous ports of growing im- portance. The alluvial coast-lands are devoted to ordinary and semi-tropical agriculture and timber produce. The basaltic plains and tablelands be- yond the Main Range, extending to what is still known as the 'Never Never country, are occupied by pioneer pastoralists with their herds of sheep and cattle.

In such a colony, two-thirds of which lies within the tropics, there is a wide variety of climate and natural capabilities. The summer heat is un- doubtedly great; but there is immunity from the heat winds since a prevailing north-westerly blows across Australia. The heat being dry, although the maximum register is 108° (the winter minimum being 34°), the exhilarating quality of the atmo- sphere is such that the hottest weather is not unbearable. For seven months of the year the climate is most enjoyable, and not improperly com- pared with that of Madeira. At midsummer (Christmas time) the rainy season commences in the tropical portion, and extends more or less until March. The colony enjoys a high repute for health, gives a low death and a high birth rate, and is free from the severe and contagious diseases. Invalids sent from the old country in what appear to be the last stages of consumption often regain health in Queensland, and live to become old inhabitants. The population at the 1891 census was 393,088, consisting of 223,781 males and 170,157 females. Free and assisted emi- gration is one of the features of government policy; and some idea of the rapid growth of Queensland may be formed from the fact that Brisbane, which in 1851 had a population of 30,953, ten years later numbered 75,000 within its five-mile radius. There are some 22,000 aborigines, mostly in the unsettled country. The revenue to June 1890 was £3,211,795; expenditure, £3,695,774; only in one of the pre- ceeding four years did the revenue exceed the expenditure. In 1890 the public debt amounted to £281,105,684—nearly £200 a head. A table of the population, revenue, comparative crops, exports, &c. of Queensland and the other Australian colonies will be found in the article AUSTRALIA.

Much of the marked prosperity of Queensland is due to the development of ocean and intercolonial steam communication. The British India Steam Navigation Company has a direct line between London and Brisbane, carrying monthly mails and despatching intermediate boats; and there is a regular coastal service to the other colonies. The steamships make regular calls at the ports for the government, from its earliest establishment, to construct harbours and improve the rivers, the coast of Queensland is now one of the best lighted in Australia. The navigable streams have been dredged at enormous cost, and the largest ocean steamships can now ascend the Brisbane River to discharge cargo at the city wharves. The postal system is worked by 834 post-offices, with a two-penny postage on inland letters and a penny for the towns. The railway system was rapidly extended in 1830-90; up to 1890, 2450 miles had been
Queensland possesses a wealth of gold and other mineral resources; and machinery has reduced gold-mining to a settled and scientific industry. After the disastrous gold rushes of the early days the miners profited by experience. But the real era of paying gold mining in Queensland did not begin until 1888. From that date to the end of 1896 its mines produced $1,198,190 ounces of gold, valued at $396,165. In 1887 the yield was 793,103 ounces; in 1895 it had decreased. In consequence of these changes it is to be regretted that Mount Morgan (q.v.) mine. It is supposed that this unique formation, 1,233 feet above the sea-level, was once a hot spring, the water of which held in solution gold which was precipitated and consolidated with other mineral matter into the coarse ferruginous stone which, contrary to the previous theories of geologist and miner, has proved the most wonderful gold-bearing material in the world. Its fine and pure gold is worth four guineas an ounce, and the gross annual output has been estimated at £1 million pounds sterling. The value of its products is shown by the fact that Charters Towers, Ravenswood, Etheridge, Gilber- ton, and Palmer. A recently discovered gold-field is the Croydon, on the edge of the alluvial flat extending to the Gulf of Carpentaria. The Palmer is the most extensive alluvial field in the colony. Coal, copper, and lead, quicksilver, manganese, and iron are found in Queensland; and there are valuable coal-mines. Opals of great brilliancy and variety of colour have been found in a few localities, and specimens of the diamond, ruby, sapphire, and topaz near Stanthorpe. Agates occur in many localities.

The wool of Queensland, clipped from the merino and coarse-woolled sheep, still maintains its high character. The number of sheep in the colony in 1890 was 14,470,095; cattle, 4,872,416; and horses, 392,364. The annual exports of wool, hides, skins, and tallow represent a total value of £17 millions. The manufactures of Queensland comprise metalfoundries, sugar-mills, tanneries, flour-mills, distilleries, saw-mills. Tweed-factories are worked in the neighbourhood of Ipswich. Of late years the teoche-dealer and pearl fisher of Torres Straits have been highly productive; and preserved meats have also become an established industry.

The seat of government is Brisbane, and the principal provincial towns are Rockhampton, Ipswich, Townsville, Cooktown, Maryborough, Gympie, Charters Towers, (see also the Darling Downs), Dalby, Roma, and Bowen. The government is vested in a governor appointed by the crown, an executive council, and two houses of parliament. The upper house or Legislative Council consists of thirty-nine life members, named by the governor, and sitting under a president elected by themselves; and the Legislative Assembly numbers seventy-two members, elected on a franchise that is virtually manhood suffrage. State aid to religion was abolished by one of the first acts of parliament. The educational system is free, secular, and compulsory, and the annual expenditure is—primary state schools, £208,747; grammar and university education, £121; technical education, £231. The defence of the colony was provided by act of parliament in 1884. A small permanent force, a defence contingent (whose members are paid for each day's drill), and volunteers make up an enrolment nearly 5,000 men. But every male between eighteen and fifty years of age has to be on military service in an emergency. The entrance to the Brisbane River (twelve miles from the capital) is defended by a battery and torpedo works, and there are two gunboats, torpedo and packet boats, and a submarine vessel.

About 4,184 million acres of land still belong to the crown, the greater part leased to squatters as sheep and cattle runs. The object of the recent governments of Queensland being to foster agricultural settlement and closer pastoral occupation, the tendency now is to leasing rather than selling; and to prevent the aggregation of large estates.

Market-gardening in Queensland, even in the large towns, is principally done by Chinamen, who have the special gift of patience for the work. On the Darling Downs, which is the garden of Queensland, oranges, lemons, limes, citron, mandarins, mandarin oranges, passion-fruit, and guavas bear profusely, and north of Capricorn all the fruit trees and spices of tropical value might be cultivated with profit but for the scarcity of labour. Ginger, pepper, and nutmeg are indigenous. The beautiful collection of timbers shown at the Colonial and Indian Exhibition in London emphasised the value of the forests of Queensland. Amongst the hardwoods are the ironbarks, stringy-barks, gums, and bloodwoods. There are several varieties of tamarinds, and the easily-worked softwoods include the sugar trees, white mahogany, red cedar, yellowwood, silky oak, tilium, and beech are prized for cabinet and ornamental purposes.

The wild animals of Queensland are neither numerous nor dangerous, always excepting the worst varieties of the snake. Alligators are numerous and destructive in the rivers of tropical Queensland. The fauna includes the usual Australian marsupials—the platypus, dingo, flying-fox, &c. Many of the birds are of gorgeous plumage. The cunnamara, the grassy swamp, is a rare appearance in the north. The rabbit has so far been successfully kept out by the Aboriginal, who tolerable success; but this imported pest is an object of dread in Queensland, which suffered so severely, before the legislature assisted in their suppression, from the plague of kangaroos. The sea-fishing is unsurpassed, and the Moreton Bay oysters are exported in quantities to the sister colonies. From the Dugong (q.v.), besides the oil, is obtained a hide invaluable for thick machinery belting.

Queensland, in common with other Australian colonies, suffers occasionally from floods and droughts. During one of the severest droughts of the century, the necessities of life were so inadequate that it was necessary for the government to give food to the people. The sugar industry is now generally recognised as an essential protection for development in the future. The sugar industry, which had somewhat declined in value, in 1898-99 showed an increase of 50 per cent. on the previous year. Owing to the rigorous laws
passed to discourage the influx of Polynesian or Chinese labour (see Coolies), the cost of cultivat-

Quesnay

dublin

As 1881 the 139. few width hilly 9123. good, Britain, Frank-

10,331 disappeared in Quesnay's Queensland European better Ireland quern; Probl&mes kind custom has Bon-

the stick, little part 1849. now and Commerce Ireland, 1891 23x48 sea-level, considerable North Dyer's fertile soil, 26x191 NE. flf

26x248 BritLsh salubrious Victoria and, till consisted value of all A.

Que^taro, Quercitron, (lieen's the name of a dyestuff and of the species of oak of which it is the bark. This oak (Quercus coccinea, var. tinctoria), also called Dyer's Oak and Yellow-barked Oak, is a native of North America—one of the noblest forest trees of the continent in New England, in New York and as far south as Georgia, although there only at a considerable elevation. For the dyestuff, see DYE-

ING, Vol. IV. p. 139.

Quercitron, an important town of Mexico, capital of Querétaro state (see MEXICO), is charac-

teredly situated on a hilly plateau, 6272 feet above sea-level, 153 miles by rail NW., of Mexico city. It contains a government palace, a cathedral, an

aqueduct supported in part upon arches 90 feet high, and two large cotton-spinning mills, employ-

ing 2300 hands. Here the Emperor Maximilian cast short by order of a court-martial, 19th June 1867. Pop.

Quesnay, a primitive mill for grinding corn, the stone of which was turned by the hand. It was a contrivance of great antiquity, and so well adapted for the wants of a primitive people, that we find it perpetuated to the present day in remote districts of Ireland and some parts of the Hebrides and Shetlands. The remains of querns have been dug up in Britain, Ireland, and the United States, wherever the traces of ancient population are found. They occur in the Scottish Earth-houses (q.v.), or cyclopean underground dwellings; in the lake-

dwellings of Ireland, Scotland, and Switzerland; and abundantly among the remains of the Roman period in Britain and northern Europe. The most usual form of quern consists of two circular flat stones, the upper one pierced in the centre with a narrow funnel, and revolving on a wooden or metal pin inserted in the lower. The upper stone is occasion-

ally equipped with iron or steel teeth and grooves, designed to crush and grind the grain. In the Roman period it is sometimes funnel-shaped, with grooves radiating from the centre. In using the quern, the grain was dropped with one hand into the central opening, while with the other the upper stone was revolved by means of a stick, inserted in a small opening near the edge. As early as 1284 an effort was made by the Scottish legislature to supersede the quern by the water-

mill, which did not, however, prevent hand-mills from being largely used in Scotland down to the beginning of the 18th century. Probably the oldest British type of quern is that which was prepared from a section of oak. A less simple variety of the hand-quern, known as the Pot Quern, and also of great antiquity, consists of a circular stone basin, with a hole through which the meal or flour escapes, and a smaller circular stone forming into it, perforated with an opening through which the grain was thrown into the mill.

See Sir Daniel Wilson's Archeology and Prehistoric Antiquities of Scotland (1853), and Sir Arthur Mitchell's The Past in the Present (1880).

Quesnay, FRANÇOIS, a great French economist, was born at Arques, near Montfort-l'Amaury, June 4, 1694, studied medicine and philosophy at Paris, and in 1718 commenced practice at Mantes. He acquired a high reputation in his profession, and at his death on 14th December 1774 was first physician to the king. But the fame of the 'European Confucius,' as he was called by his followers, depends upon his speculations in political economy, in the pages of the famous Encyclopédie (articles 'Fermiers' and 'Graines') and various serials. Around him and his friend, M. de Gournay, gathered the famous group of the Economistes, also called the Physiocratie School (q.v.; and see Politicians Economists, p. 288). Quesnay's views were systematically set forth in a little treatise, entitled Tableau Économique. Only a few copies of this work were printed about the end of the year 1758, and these have now all disappeared; yet the principles maintained by Quesnay are well known, both from the sources above mentioned, and from other treaties that have met with a better fate—his Maximes Générales du Gouvernement Économique d'un Royaume Agricole, the notes to which occupy more space in the last edition; and also the famous section included in the Physiocratie of Dupont de Nemours; Analyse du Tableau Économique; Problèmes Écono-

miques; and Dialogues sur le Commerce et sur les Travaux des Artisans—collected in Oncken's edition of his Oeuvres Économiques et philosophiques (Frank-

fort, 1888).
Quevedo, Pasquier, a French theologian, was born at Paris, July 14, 1634, and, after a distinguished course in the Sorbonne, entered the Congregation of the Oratory in 1650. His great work was his reputation for learning and piety that at the age of twenty-eight he was appointed director of the Paris house of his Congregation. It was for the use of the young men under his care that he commenced the celebrated series Réflexions Morales sur le Roman de Quevedo. In 1684 he published an edition of the works of Leo the Great, in which the notes was held to maintain Gallissianism (see GALLICAN CHURCH), and was accordingly placed on the Index. Having refused to subscribe the formulary condemnatory of Jansenism required by a decree of 1684 from all members of the Oratory, Queuel saw himself compelled to flee to the Low Countries, where he attached himself to Arnauld. He continued at Brussels his Réflexions, which were published in a complete form, with the approval of the Cardinal de Noailles, Bishop of Châlons, and ultimately Archbishop of Paris (1693-94). The Jesuits were unceasing in their malignant hostility, and Queuel was denounced and flung into prison, but escaped to Holland. His book was finally condemned in 101 several propositions by theindex bull Unigenitus (1713). Queuel spent his last years in Amsterdam, where he died December 2, 1710. A complete list of his many books will be found in Moréri's Dict. Hist. His Letters were edited by Le Courayer (1721-23). For the later history of Jansenism, see Séehe, Les Dames Jansénistes (1891).

Quetlet, Amhert Adolphe Jacques, a celebrated Belgian statistician and astronomer, was born at Ghent, 22d February 1796, and studied at the lyceum of his native city. Here at eighteen he began to teach mathematics, and five years later was appointed to this chair at the Brussels Agricultural School. He superintended the building of the Royal Observatory, and became its director in 1828, while in 1836 he accepted the chair of Astronomy and Geodesy at the Brussels Military School. From 1834 he was perpetual secretary of the Belgian Royal Academy. He died 17th February 1848. His scientific work lay mostly in the regions of meteorology and statistics; and, in the last, to anthropology. His greatest book is Sur l'Homme et le Développement de ses Facultés (1835), in which he sums up his researches on the physical and intellectual qualities of man. Both in this and in later works In Commissie Centrale de Statistique, in l'Anthropométrie et en Droïne des diverses Facultés de l'Homme (1871), and in other books and papers he shows the use that may be made of the theory of probabilities, as applied to the 'average man'—at times carrying out that notion so as to arrive at a mechanical precision not justified by facts, and rejected by later writers on 'mind statistics.' Quetlet's contributions to meteorology, astronomy, terrestrial magnetism, &c., in the Mémoires and Bulletin of the Belgian Royal Academy, were numerous and important. See Maitland, Historical Essays on the Travaux de Quetlet (1875), and Wolowsky's Etude (1875).


Quetzaltenango, the second city of Guatemala, the capital of a department of the same name, is on the Sigüla, 95 miles W. by N. of Guatemala city. It contains an ornate church, the Madame, government buildings in the republic, a national college, and a conservatory are lit with the electric light; the houses are built of a light-brown lava from the Cerro Quemado ("Burned Mountain"), which overlooks the city. Quetzaltenango is the centre of the trade in native cottons. The nearest port is Chamepier, on the Pacific, from whence a railway extends to Zitakultulle (27 miles). Pop. 20,000. mostly Indians.

Quevedo Villegas. Francisco Gomez de, was born at Madrid in 1580. His father was secretary to the queen and his mother one of her ladies in waiting. The Quevedos were one of the old families of the Montaño, the mountain-region between Burgos and Santander. The name was no doubt derived from a place on the Besaya river, but the punning motto of the scutcheon on their house in the adjacent Toranzo valley, "I am he who stopped—el que vedó—the advance of the Moors," expressed the family tradition, and, like that of the Spanish de Vega, Calderon, and others of the race, Quevedo was not a Moorish or a Nasrini, but an ancestry that claimed a share in stemming the tide of Moslem conquest. Villegas was the name of his grandmother's family, another of the same mountain stock. He was left an orphan at an early age, and sent by his guardian to the university of Alcalá, from which he came away with such a name for varied scholarship that he may be said to have entered upon life with a reputation ready made. Apparently a quiet, studious, meditative life would have been his own choice, but chance overruled this wish for him. Being during a vital issue of a duel, brought about by his chivalrous chivalry of a woman who had been insulted in his presence, drove him in 1611 to the court of his friend the Duke of Osuna, the new viceroy of Sicily; and, perceiving in Quevedo, poet, scholar, as he was, the capacities of an able administrator for him, he made him his right-hand man, and kept him constantly employed in confidential missions to Rome, Milan, Genoa, and Venice, and when promoted to the vice-royalty of Naples, chose him as his minister for finance, a place in which Quevedo's success was only equalled by his industry.

He was involved in the fall of Osuna in 1619, and kept in prison for a time, but there was in fact nothing to tax him with except fidelity, and he was permitted to retire to La Torre de Juan Abad, a small estate of his in the Sierra Morena; he was allowed, however, to return to Madrid in 1623, and became a persona grata at the court of Philip IV. In 1626 he published his most important work, the Politica de Dios, sketched probably in Italy, but put into shape during his banishment. He had no fear of a ten years behind the scenes, and watched the working of one-man-rule in its worst form under the autocracy of the Duke of Lerma, and in the Politica he made an earnest and eloquent appeal to the king to be a king, not in name only, but in fact. "The heart of the king," he said, "must be in no hand but his." Probably it would be difficult to see the light had Philip IV. been true to the promise of his youth; but he soon grew weary of governing, and left it to Olivares, and so long as Olivares remained in power Quevedo's book continued to be a popular one. In 1628 he followed up his attack on government by fugitives in an essay on RELIGIOUS REFORMED. He remained, however, on friendly terms with Olivares; and if honours and high
place could have tempted him he might have had anything in the minister's gift. He would have been a valuable but trustful an unstable regime, and it was desirable to silence a man who had an awkward knack of telling the truth in a way that brought it home to the public. But Quevedo had better things to do. His first love was poetry, and the sensation that he could be got to accept was the purely honorary title of secretary to the king. In the winter of 1639 another way of effecting his purpose presented itself to Olivares. A memorial in verse to the king, imploring him in respectful and loyal language to remove his rival, and the condition of his kingdom, was one day placed in his napkin on the royal table. Quevedo was demoted as the author (and no doubt he was, though his biographer, Dr de Tarsia, strives to disprove it), and was arrested at night and carried off to the convent of San Marcos at Leon, where, heavily ironed, he was lodged in a cell below the level of the river that washes the convent wall. He was soon struck down by an illness, brought on by cold and damp, from which he never recovered. He was not released till the year 1643, and then went home to La Torre to die; but the next year his sufferings became so acute that he had to move to Villanueva de los Infantes for medical aid, and there death released him in September 1645.

Quevedo was one of the most prolific Spanish poets, and was ranked by his contemporaries with Juan de Mena, Garcielas, Lope, and Gongora; but he wrote no poetry for the world. His verses were all written for his friends or for himself, and, except those in the Flores de Espinosa (1663), the few pieces published in his lifetime were printed without his consent. Poetry was with him a recreation and a solace, and, according to his nephew, some of his gayest and brightest verses were written in his cell at San Marcos. His poetry was more than that of his predecessors dramatic character, and to a great extent made up of what would now be called vers de société; sonnets, sermons, and satirical, form a large portion of it, and light humorous ballads and songs a still larger. His more ambitious work is at times disfigured by extending the work of his predecessors, and poems he once would write. All through life he was at war with the poets of the 'Culto' school, Gongora and his followers ('the scourge of silly poets' Cervantes called him), and this perhaps may have made him chary of appearing in public as a poet; but if he took no pains to place himself upon the roll of Spanish poets, he added to it the name of Francisco de la Torre, whose poems he discovered and published in 1631. It was for a long time maintained that the discovery was a pretended one; but it is now admitted that he could not have been the author of his verses. His first book was a life of St Thomas de Villanueva in 1629 and his last, in 1644, a life of St Paul; and the greater part of his prose is of the same character, as is indicated by the titles: The Patience and Constancy of Job, The Oraible and the Grave, Virtue Militant, The Martyrdom of Marcus Musculo, Instruction how to Die, The Introduction to Devout Life, from St Francis de Sales, and others of the same kind. Of his political works the Politica de Dios is the chief; but he also wrote a Life of Marcus Brutus, to which he was adding a second part when struck down by his last illness, a Letter to Louis XIII., on the war of 1635, and several shorter tracts. In 1626, at Saragossa, his brilliant picaronsque novel, the Vida de Manuel de Cervante, was printed, and after his death, the Gran Tucano, was printed, apparently, like most of his books, without his permission, and at once took its place beside Guzmam de Alfarache; and in 1627 his great Visions, four of which had been written between 1607 and 1615, and the rest between 1622 and 1624, were printed in the same way at Barcelona. His friend, Vander Hammen, immediately printed three of them at Saragossa from his own copies, and added the Casa de los locos de Amor (The Madhouse of Lovers), which has ever since been wrongly attributed to Quevedo. He himself disowned it; it bears no trace of his hand, and it is not printed as his by Vander Hammen, who, moreover, afterwards confessed himself the author. Chiefly for the sake of the vision or apologue of the Politica de Dios, the first edition, which did not affect the Politica de Dios, he wished the Visions to appear in an authorised edition at Madrid; but unhappily they were submitted for examination to the Padre Niseno, a friend of Montvalan, the dramatist, who had a grudge against Quevedo, and very nearly succeeded in obtaining a condemnation of the whole. It was, however, permitted, and the mutilations of his work which in some places make utter nonsense of it; and it is in this mangled shape the Visions have been printed ever since 1631. He added some short humorous pieces, on the affectations of the Culto school, the use of vulgar slang; phrases, silly rhymes, and the like; and better to mask the designs of the others, he called the volume Juguetes de la Niñez (Playthings), and apologised for the whole as the work of his youth, though the principal piece was written only three years back. The vision or apologue was Quevedo's favourite form of expression; his peculiar humour and satire are nowhere better seen than in Fortuna con Seco (Fortune Right), written in 1635, but not printed till 1650, in which Fortune demonstrates by example that if strict logic and justice took her place mankind would have a great deal more to complain of.

The edition of Quevedo's works in the Biblioteca de Autores Españoles (vols. xxiii. and xxiv., prose, edited by Aureliano de la Fuente, and also by Florencio Janer) is the only one that can be said to approach completeness. Many of the pieces in it are printed for the first time. The prose is edited with commendable thoroughness and industry; but Sehor Fernandez-Guerra has unfortunately preferred the expurgated text of the Visions to that which came direct from the hand of Quevedo; he gives, however, the most important of the variations in his notes. The volume of verses is less satisfactory, and follows the stupid pedantic arrangement of the 17th-century editors. After Quevedo's death editions followed in quick succession, but most of them are slovenly in the extreme as regards editing, paper, and print. A handsome edition in 3 vols. 4to was issued by Foppens (Brussels, 1660-71), and well printed, if not critical ones by Ibarras (Madrid, 1648), by Sancha (11 vols. 8vo, Madrid, 1791-94), and by Castellana (5 vols. 8vo, illustrated, Madrid, 1841-45); and an admirable selection (which in Quevedo's case is not only a defensible but a desirable form) was published by Villalpando in 1798 (4to). The earliest translations from Quevedo were into French by the Sieur de la Geneste, who translated the Politica de Dios in 1653, the Hell Reformed in 1654, and the Vida de los Inocentes, to Robespierre in 1653, or 1641 according to Brunet. His versions are by no means faithful or accurate, but they have the advantage of being based upon Quevedo's original text. From them most of the English versions have been made—e.g. Visions; or Hell's Kingdome, by R. Crotshawe (1640); Hell Reformed,
Quiberon, a small fishing-town of France (dept. Morbihan), at the extremity of a long narrow peninsula, 21 miles SW. of Vannes. Pop. 1036. It was here that a body of French enfraged royalists landed from an English fleet in 1705, and endeavoured to raise the people of Brittany and La Vendée against the Convention. They were defeated and driven into the sea by General Hoche. Nearly all the prisoners taken were shot by order of the Convention. On 20th November 1759 Hawke completely defeated a French fleet under Admiral Conflans in Quiberon Bay.

Quichua, the language of the Indians of Peru (q.v.).

Quick, Robert Hervert, was born in 1832, had his education at private schools and at Harrow, whence he passed to Trinity College, Cambridge. He took orders, held curacies in Whitechapel and Marylebone, and was appointed by his college to the vicarage of Sedbergh in 1883, but four years later resigned the living. He had an intense love of children, and the great interest of his life was education. To the discussion of its theories he brought wide study, independent thought, and ripe wisdom; witness his bright and delightful Essays in English Literature (1886); 2d ed. (1899). His practical knowledge of the work of teaching he had gained by service at Cranleigh, Harrow, and elsewhere. He died at Cambridge, 9th March 1891.

Quicks. See Couch-grass.

Quicksand (quick—i.e. ‘living’ or ‘moving,’ and wind), in its usual significance, a tract of sand which, without differing much in appearance from the shore of which it forms part, remains permanently saturated with water to such an extent that it cannot support any weight. Quicksands are most often found near the mouths of large rivers. They appear only to be formed on flat shores, the subsoil of which is an impervious mass of gravel, clay or other impervious formation. Pools of water are retained in the hollows, and become partially filled with sand or mud, which remains like the soft sediment in a cup of cocoa on account of the absence of drainage. The sand on a uniform shelving shore consists loosely; overlying sand, which sinks and takes up water when impervious it drains back freely to the sea. In narrow channels through which the configuration of the adjoining shore causes strong tidal currents to run the sand may be kept so constantly stirred up by the moving water that a quicksand results. The body of seaweed, usually at some distance from a gentle slope is usually firm, the hollow margin of the bank where it meets the shore is frequently a quicksand. Quicksands are not common of great extent, and their danger has probably been exaggerated in the popular mind by sensational descriptions in works of fiction—e.g. in the British author, M. Moonstone. Persons sink in a quicksand exactly as in water, only more slowly; and it is probable that if the victim did not struggle he would not sink over the head, as experiments show that water containing a quantity of solid matter in suspension has its floating power increased. With a commotion of quicksand and the belief amongst sailors that if a vessel is stranded on a quicksand it is inevitably sucked down. This cannot be the case unless the vessel springs a leak, or heels over sufficiently to let the semi-liquid sand enter. The idea may have taken rise from the popular notion that a boat of quicksilver, or from the fate of small vessels stranded at low tide on a stiff bank of clay which held them fast and allowed the rising tide to submerge them.

The name quicksand is sometimes applied, especially by old writers, to the drifting sands which are carried by wind over cultivated land bordering the seashore or a desert. See Downs, Drift, Dunes. Quicksilver. See Mercury.

Quietism, a name given to a tendency shown at various periods in the history of the church by many classes of mystical religious enthusiasts, of widely different beliefs, to make perfection on earth consist in a condition of uninterrupted contemplation. In this state of contemplation it is the soul's reason, to reflect either on itself or God, or to form any of the ordinary acts of faith, its sole function being passively to receive the infused heavenly light which accompanies this state of inactive contemplation. The first of modern Quietists was the Spanish priest Molinos; his most famous disciple, Madame Guyon, whose gentle but powerful influence led into the same mode of thought the saintly Fénelon. Quietism has been called the Spanish analogue of Quakerism in England, of Jansenism in France, of Pietism in Germany; but these several systems, though they had common tendencies, were also sharply distinguished. It may be said that Quietism involves but little of practical consequence, whether for good or for evil. This may and does hold true in the case of noble and lofty souls like Fénelon; but what moved Molinos, what gave the name of Quiets to the aforesaid Madame Guyon, was the belief that, carried to its logical conclusion, Quietism led to Antinomianism, and would inevitably prove pernicious in its effects upon the vulgar crowd of followers. From the belief of the lofty and perfect nature of the purely passive state of contemplation there is, it was held, but a single step to the fatal principle in morals, that in this sublime state of contemplation all external things become indifferent to the soul, which is thus absorbed in God; that good works, the sacraments, prayer, are not necessary, and hardly even compatible with the repose of the soul; that so complete is the self-absorption, so independent is the soul of corporeal sense, that even criminal representations and movements of the sensitive part of the soul, and even the external actions of the body, fail to affect the contemplating soul, or to impress it with their dehasing influence. See Bossuet, Fénelon, Guyon, Molinos; also Hoppe, Geschichte der quietistischen Mystik in der Kathol. Kirche (1875).

Quirgh. See Fillan (St.).

Quillimane, a seaport of East Africa, in the Portuguese territory of Mozambique, stands about 15 miles from the mouth of the river of the same name, the northern arm of the Zambezi delta. The town stands on a sand-bank inhabited by native cottons, beads, hardware, arms, coal, spirits, and food-stuffs to the annual value of £60,000, and exports ivory, ground-nuts, India-rubber, wax, copal, and oil-seeds to a value that ranges between
Quillota, a town of Chili, in the fertile valley of the Aconcagua, 13 miles from its mouth, and 25 miles by rail NE. of Valparaiso. Pop. 6000.

Quills are the large feathers of the wings of birds, certain kinds of which have for centuries been used in writing pens. From the swan, goose, and turkey the kinds are obtained that are regularly prepared for writing purposes, crow quills being used for drawing. A quill, like horn or hair, is formed of epidermic tissue, and the barrel or tube (the quill proper) has an external membrane and an internal pit. In order to get rid of these, and to bring the naturally soft state of the barrel into a condition ready for making into a pen, it requires to be dressed. The quill-dresser sits beside a fire enclosed with brick sides and with an iron plate in front, containing a hole somewhat at the west coast, 33 piece. He first heats the quill by placing it for one or two seconds in this hole, which enables him to scrape off the outer membrane with a thick strong knife, the quill being pressed nearly flat in the face. This done, he again holds it for a brief time in the furnace, in which the quill acquires the proper strength and brittleness to admit of its being made—by a knife or machine—into a pen with a clean slit. Quills were formerly prepared for writing by another process, which is still used for such as are made into toothpicks. This consists in steeping them for a night in water and then manipulating them in hot sand. Although the manufacture of quill-pens is a declining industry, they are still made in considerable numbers. The Controller of the Government Stationery Office, thinking the matter of some public interest, published between 1863 and 1873 a yearly statement showing the numbers of steel pens and quills supplied for the public service. These reports show that as late as the year 1868 there was still a large number of quills used. The figures are: quills, 4000 gross; steel pens, 14,942 gross, value £1900. These figures did not materially differ for the four previous years, but in 1873 the annual number of quills supplied had diminished by nearly one-half. In the quantities issued from the Stationery Office were: Quills, 4000 gross; steel pens, 38,000 gross.

Quilma, or Kilwa, a seaport of East Africa, in German territory, 100 miles S. of Zanzibar, and an outlet for the trade with Nyassaland, exports ivory, gum copal, rice, and manioe. Pop. 6000, including a number of Banyans.

Quilon, or Kilwa, a town of Southern India, in the state Travancore, is connected with the west coast by the NW. of Cape Comorin. A settlement of the ancient Syrian Church and subsequently of the St. Thomas Christians, it was, under the names Coilon and Columbura, a famous mart for the trade in timber, ginger, pepper, &c. The Portuguese built a fort there in 1505, which the Dutch took in 1653. From 1683 to 1830 it was garrisoned by the British. Pop. 13,588.

Quimper, a town of France (dept. Finistère), is prettily situated on the Odet, 11 miles from its mouth, and 63 miles by rail SE. of Brest. Its cathedral (1239-1515), a stately and richly-carved and ornamented edifice, is the principal building; there are also a college, a museum, and an agricultural school. Pottery is in operation, as well as tanneries, sailworks, &c.; and fishing is carried on. Pop. (1872) 13,159; (1891) 17,406.

Quin, James, a celebrated actor, was born in London, of Irish descent, 24th February 1693, and made his first appearance on the stage in 1714 at Dublin. Shortly after he proceeded to London, where he was engaged at Drury Lane, but for quill inferior parts. In 1716, however, the sudden illness of a leading actor led to Quin's being called on to sustain the character of Rajzat in the once famous play of Tamerlane. His success was marked. Next year he exchanged Drury Lane for Rich's Theatre in Fleet-street, where he remained as a principal actor for seventeen years. Not long after leaving the former place he had the misfortune to kill a brother-actor in a duel—a circumstance which clouded his reputation for a while. The only real fine parts which he seems to have played were Captain Macheath in the Beggar's Opera and Fairstaff in the Merry Wives of Windsor. In 1734-35 he returned to Drury Lane Theatre, 'on such terms,' says Cibber, 'as no hired actor had before received,' and from this date until the appearance of Garrick in 1741 he was by universal consent the first actor in England. In 1746 Quin and Garrick acted together in the Fair Penitent, as a contest for pre-eminence. The novelty of seeing the two rival actors in the same tragedy, and the admirable acting of Mrs. Cibber as the Fair Penitent, contributed greatly to the extraordinary success of this play. The superiority of Garrick was acknowledged by the best judges; and Quin, by no means pleased at his rising fame, sarcastically declared that 'Garrick was a new religion, and that Whitefield was followed for a time, but they would all come to church again.' In 1751 he withdrew from the stage, and fixed his residence at Bath, where he died, January 21, 1766. In society Quin was also popular, his conversation being full of wit and his stories amusing though coarse. He had a most benevolent heart, and among his many charities he made an endowment of £1900 a year to give a great service to Thomson by delivering him from arrest, and afterwards lived 'in fond intimacy' with the poet, as Johnson tells us in his Lives of the Poets. An anonymous Life of Quin, dedicated to Garrick in 1776, was reprinted in 1887, with a supplement of corrections and additional information.

Quince (Cydonia), a genus of trees and shrubs of the natural order Rosacea, sub-order Pomeae, nearly allied to Pyrus, with which many botanists have united it under the name P. Cydonia, but this does not distinguish it from the true quince, an agreeable fruit, in each cell, and by their very mucilaginous nature. The Common Quince (C. vulgaris), a native of the south of Europe and temperate parts of Asia, is a low tree, with generally tortuous branches, ovate, entire, deciduous leaves, and rather large white flowers, which are solitary at the extremity of young branches. The fruit is in some varieties globose, in others pear-shaped, of a rich yellow or orange colour, with a strong smell. It is hard and austere, but when stewed with sugar becomes extremely pleasant, and is much used in this way either by itself or to impart a flavour to apple-pies. It is also much used for making a preserve called Quince Marmalade. A delicious beverage somewhat resembling elder is made from it. The seeds, which readily give out their mucilaginous matter, so that fifty or sixty times their amount of water into a substance as thick as syrup, have long been used in medicine. Quince muelagre or quince gum, Cydonia, is allied to Bassorin, but differs from it in being readily soluble in water (see GUM). The quince is also cultivated in Syria and Romans, and is at the present day cultivated in the south of Europe, in England, and generally in temperate climates. Its principal use in Britain
Quincy, DE. See De Quincy.

Quincy, (1) the third city of Illinois, and capital of Adams county, is on the Mississippi River, 160 miles above St. Louis and 262 by rail SW. of Chicago. It is handsomely built on a high bluff, has a large trade by the river and extensive railway connections, an important railway bridge crossing the river at this point. The public buildings include a fine court-house, a medical college, several hospitals and asylums, an Episcopal cathedral, and some forty other churches. The city has many large flour-mills, machine-shops, foundries, saw- and planing-mills, breweries, and manufactories producing stoves, furniture, carriages, tobacco, &c. Pop. (1850) 31,494; (1890) 36,252. (2) A town of Massachusetts, near the sea, and 8 miles S. of Boston by rail. The town-ship produces the famous Quincy granite, and was the birthplace of John Hancock, John Adams, and his son, John Quincy Adams. Pop. (1900) 23,899. Quincy city is co-extensive with the town.

Quincy, Josiah, an American orator and man of letters, and son of Josiah Quincy (1744-75), an eloquent advocate of the rights of the colonists, was born at Boston, February 4, 1772, graduated at Harvard in 1790, and was called to the bar in 1793. He took an active interest in politics as a leading member of the Federal party in New England, and was elected in 1804 to congress, where he became distinguished as a ready, earnest, and fervent orator. He was one of the earliest to denounce slavery, but his most remarkable speech was one in which, spurred on by the jealousy with which the old New England colonies regarded the new western states, he declared that the admission of Louisiana would be a sufficient cause for the dissolution of the union, and that, as it would be the right of all, so it would be the duty of some, to prepare definitely for a separation—peaceably if they could, violently if they must. Disgusted with the triumph of the Democratic party and the war of 1812, he declined a re-election to congress, and devoted his attention for a while to agriculture.
made the blow he struck the order the deadliest it had received in France since the days of Paseau. But his lectures caused so much excitement that government suppressed them in 1846. Next came the Revolution, in which Quinet took his place on the right. He had been elected to represent Ain in the National Assembly, where he voted in the Extreme Left. He was little of a practical statesman, but from the beginning he saw the traitor under the mask of Louis Napoleon. After the coup d'état he was exiled to Brussels, whence again was himself to Veytaux on the shores of the Lake of Geneva. His mother had died in 1847, his wife in 1851, and so soon after his exile he married the daughter of a Roumanian patriot, Georges Asakly. At Brussels he produced Les Esclaves (1853), and an edition of the chief writings of Marigny de Ste Aldegonde (1856); and in Switzerland Merlin l'Enchanter (2 vols. 1860), a book of enormous rhetorical power, lofty but ill-sustained thought, and dazzling imagery. Other works were La Révolution Religieuse au XVIIIe Siècle (1857) and L'Épitaphe (1869) - a delightful fragment of an autobiography; Histoire de la Campagne de 1815 (1862), in which he showed that Napoleon's fall was due to his own outrage upon righteousness alone; La Révolution (1865), in which he demonstrated that its frightful crimes were in no sense inhuman or unjustified, but begotten by twelve centuries of despotic education. All the disasters of French history he traced to the national denial of righteousness in the Revocation of the Edict of Nantes; the Terror was the direct result of St Bartholomew and the Dragonnales, and again it was the parent of the 18th Brumaire and the 2d December. After the downfall of Napoleon III. he returned to Paris, and during the siege strove to keep aglow the expiring fire of patriotism. He sat in the National Assemblies at Bordeaux and Versailles, and inspired great enthusiasm by his impassioned if somewhat vague orations. He died at Versailles, 27th March 1875.

Quinet's last books were La Création (1870), a characteristically bold and imaginative incaution into the domain of science; La République (1872); and L'Épitaphe (1874). Le Livre de l'Enfant appeared posthumously. His wife published in 1870 Mémoires d'Exil; his Correspondance Inédite followed in 1877 (2 vols.), his Lettres d'Exil à Michel et à Divers Amis in 1844-46 (4 vols.), an edition of Frederick's Complete Works in 26 vols. (1857-79) was prepared by an influential committee as a national tribute of respect to the poet, the prophet, and the patriot. See his biography by Charles Quinet (1880), his widow; Richard Heath's Edgar Quinet; His Early Life and Writings (1881); also the essays by Professor Dowden in Studies in Literature (1878), and E. Montégut in Mélanges Critiques (1879).

**Quinine** is an alkaloid having the chemical formula C_{18}H_{24}N_{3}O_{8}·3H_{2}O. Along with cinchonine, dihydrocinchonine, and a large number of other alkaloids, it is present in the bark of numerous species of Cinchona and Remijia, of which these subgenera are definitely the most important. Good barks yield an average of 5 to 6 per cent, total alkaloids, of which one-half is quinine and cinchonidine, the other half consisting of the other alkaloids in varying proportions. Quinine is by far the most important from a medical and commercial viewpoint, and the acetate and hydrochlorate are the most important commercial products. Good barks yield somewhat greater than 14 and 8 per cent, being the extremes. Quinine is obtained from the powdered bark by treating it with lime, and then extracting the mixture with alcohol, neutralising with an acid so as to obtain a salt of quinine, and finally purifying with carbon dioxide. In 1914, Cawthron and Cavendish isolated pure quinine, and demonstrated that it was the chief active ingredient in the bark. Many attempts have since been made to prepare it artificially, but without success. For the introduction of the bark into Europe, and the culture of the tree in South America and (recently) in India, see Cinchona.

Quinine itself is not used in medicine, owing to the inconveniences arising from its insolubility in water, but the hydrochlorate, or salt of quinine, and the sulphate and hydrochlorate, are included in the British Pharmacopoeia along with numerous preparations of cinchona-bark containing them. The sulphate is the most commonly used preparation, and it is popularly known as quinine. It occurs in small prismatic crystals which have a purely and intensely bitter taste, and are sparingly soluble in water (1 in 700 parts); its solutions have a bluish or fluorescent colour even when very dilute. In alcohol or dilute sulphuric acid it is very soluble. The hydrochlorate closely resembles the sulphate, but is much more soluble in water (1 in 34 parts), and its solutions are not fluorescent. When treated with excess of chlorine water and a few drops of ammonium solution, solutions of quinine give a clear emerald green colour; if ferrous ammonium carbonate be added this changes to a ruby red.

Preparations of quinine, and especially the sulphate, are very largely used in medicine. Locally applied dilute solutions (2 to 4 gr. to the oz. of water) have a germicidal, antipretective, and antifibrinolytic action, and prove useful in the treatment of ulcers in bay fever, dyspepsia, diarrhoea, and similar diseases. As a bitter tonic small doses (1 to 2 grains) are frequently given in general debility, atonic dyspepsia, anemia, scorbutis, convalescence from acute diseases, and other conditions where tonic treatment is required. It is also of great value as an antipyretic and antiperiodic. In healthy persons it does not reduce the bodily temperature, but in typhus, typhoid, rheumatic, and some other fevers it is extremely valuable in this respect. A dose of 5 to 15 grains may be given in these cases. In fact, it does not reduce temperature. In malarial affections of all kinds it is supreme, and at present no other known drug can compare with it in efficacy. In intermittent fevers and ague the best plan is to begin its administration about eight hours before the attack is expected, and continue it in hourly doses for three or four hours until 15 to 30 grains have been given. It cuts short or aborts the recurring febrile attacks. It is also of great value as a prophylactic in persons who are exposed to the risks of malarial poisoning. In cases of dropsy the twice daily dose is usually considered a sufficient dose.

Quinine is also largely given in neuralgia and in inflammations. Large doses are very apt to irritate the stomach, and sometimes produce a train of symptoms known as cinchonism. There is stinging in the ears, dizziness, deafness, a feeling of fullness in the head, and disturbance of vision—all of which usually pass off without leaving any ill results. In some cases the effects are more severe, and may lead to dangerous depression and collapse, especially if the patient be already weakened by disease. Certain persons are very susceptible to the action of quinine, and suffer from cinchonism after small doses. In others skin eruptions, edema of the face, irritation of the bladder and kidneys, and other disagreeable effects are sometimes seen. Workers in quinine factories also occasionally suffer from skin eruptions. These accidents are, however, comparatively rare.

The sulphate of cinchonidine and sulphate of cinchonine are also included in the British Pharmacopoeia, but are very much less used. They seem, however, to be efficacious, and are cheaper.

See works by J. E. Howard (1876), C. R. Markham (1880), Mansuy (1882), and Flückiger (1894).
Quinoa (Chenopodium quinoa), a valuable food-plant, a native of Chili and the high table-land of Mexico, which much resembles some of the British species of Chenopodium (q.v.). In the countries in which it is indigenous it is much cultivated for its seeds, which form a principal food of the inhabitants. The meal made from some seeds is red, giving to the dish a peculiar flavour, but it is very nutritious and is made into a kind of porridge and cakes. The plant is sometimes cultivated in British gardens for its leaves, which are a good substitute for spinach.

Quinoline, a pungent colourless liquid obtained by the distillation of bones, coal-tar, and various alkaloids, is a base of the organic bodies, and is isomeric with Lecyn (q.v.).

Quinquagesima (Lat., 'fiftieth'), the Sunday immediately preceding Ash-Wednesday. The common explanation of the name Quinquagesima, and of Sexagesima and Septuagesima, the two preceding Sundays, is that the Sundays are, roughly speaking, about fifty, sixty, and seventy days respectively before Easter. Quinquagesima, indeed, is exactly fifty days before the Octave of Easter—i.e. Low Sunday (q.v.). But probably the terms were adopted without any intention of expressing delineated periods and simply in analogy with Quadragesima, the Latin name of Lent.

Quinquernae, vessels with five banks of oars, however arranged (see TRISKME), may be regarded as the first-rates of the ancient navies.

Quinsy (originally squinancy; Fr. quinquanie; from Gr. kynaneia, known also as Cynanche Tonsillaris and Tonsilitis, or as 'inflammatory sore throat,' is an inflammatory affection of the sub-stance of the tonsils attended when fully-developed by suppuration (see PALATE). The inflammation is seldom limited to these glands, but extends to the uvula, the soft palate, and the pharynx. The disease usually manifests itself by difficulty in swallowing, and a sense of heat and discomfort in the throat, often amounting to considerable pain. On examination the throat at first exhibits unnatural redness, with enlargement of one or both tonsils. The uvula is enlarged and elongated, its end either dropping down into the pharynx, and, by exciting the sensation of a foreign body, giving rise to much irritation, or else adhering to one of the tonsils. The tongue is usually furred, and the pulse rapid, and there are the ordinary symptoms of that form of constitutional disturbance known as inflammatory fever. The inflammation terminates either in resolution (if the attack is not severe, and yields readily to treatment) or in suppuration, which may be detected by the occurrence of slight rigors, and by the increased softness of the enlarged tonsil. The matter which is discharged has sometimes a very fetid smell, and the fetor may be the first indication of the rupture. The pulse becomes the chief sign of the discharge of matter, and recovery is then rapid. The disease usually runs a course of from three to seven days: but it may be prolonged if, as sometimes happens, the two sides are successively affected. It almost invariably terminates favourably. It is most common between the ages of fifteen and twenty-five. The ordinary exciting cause of this disease is exposure to cold, especially when the body is warm and perspiring; and certain persons (or even families) are so subject to it that slight exposure is almost sure to induce it.

The patient should remain in bed, or in the house (or, in cold weather, even in bed), and should be kept on low, non-stimulating diet. According to Sir Morell Mackenzie, the best treatment at the commencement of the attack consists in the administration of quinine. He gives it in the form of lozenges, each containing three grains, and one to be sucked every two hours, and states that by this means the disease may generally be averted. Baking soda (bicarbonate of soda) applied to the affected part on the tip of the forefinger every hour or half-hour often has the same effect. In more severe cases the patient may gargle frequently with lukewarm water, and apply hot poultices or fomentations to the side of the neck. Blistering and leeching will sometimes give relief, but if suppuration is once established they do harm rather than good. If the tonsils are very much enlarged they should be prickled with a lancet to let the blood flow.

Quintain was an instrument used in the ancient practice of tilting on horseback with the lance. It consisted of an upright post, surmounted by a cross-bar turning on a pivot, which had at one end a flat board, at the other a bag of sand. The object of the tilt was to strike the board at such speed that he would be well past before the bag of sand, as it whirled round, could hit him on the back. At Offham in Kent, 7 miles WNW. of Maidstone, there are the remains of an old quintain; and at the May games held at St. Mary Cray in Kent, near Bromley, in 1891 the quintain was also revived.

Quintal, a French weight corresponding to the English 'hundredweight,' was equal to 100 pounds (livres); on the introduction of the metric system the same name was employed to designate a weight of 100 kilogrammes (see GRAME). The metric quintal, equivalent to 220 lb. avoirdupois, is thus more than twice as heavy as the old one.

Quintana, Manuel José, whose patriotic odes obtained for him the surname of the 'Spanish Tyrtæus,' was born at Madrid, 11th April 1772, studied at Salamanca, and established himself as an advocate in his native city, where his house became a resort of the advanced liberals of the time. Besides his Spanish Plutarch (Vidas de los Españoles Celebrés, 1807-34), a work which is reckoned one of the finest Spanish classics, he published one or two tragedies, and an excellent selection of Castilian poetry. On the restoration of Ferdinand VII. in 1814, his adherence to the exiled liberals caused his imprisonment for six years; but he ultimately forced the liberal cause, held office, and died 11th March 1857.

Quintett, a musical composition for five solo voices, or for five instruments, each of which is obbligato. Quintets for strings have been written by Beethoven, Schubert, Mozart, Schumann, Brahms, and Raff. Of vocal quintets one of the most notable is that in Wagner's Meistersinger.

Quintilian. Marcus Fabius Quintilianus was born about A.D. at Calagurris (Collabria), in Spain, and attended in Rome the orations of Domitius Afer, who died in 50. After this date however, he revisited Spain, whence he returned in 68 to Rome, in the train of Galba, and began to practise as a pleader in the courts, in which capacity his value was greatly appreciated by the new emperor, who was more distinguished, however, as a teacher than as a practitioner of the oratorical art, and his instructions came to be the most eagerly sought after among all his contemporaries, his pupils including Pliny the Younger and the two grandsons of Domitian. As a mark of this emperor's favour he was invested with the insignia and title of consul; while he also holds the distinction of being the first public teacher who benefited by the endowment of Vespasian, and received a fixed salary from the imperial
QUITO

His professional career as a teacher of eloquence commenced probably about 72, but after twenty years of labour as advocate and teacher he retired into private life, and died probably about 1534, possibly due to his great work entitled De Institutione Oratoria Libri XII., a complete system of rhetoric, which he dedicated to his friend Victorius Mareillus, himself a court favourite and orator of distinction.

It was written as he tells us in his preface to his second book after his five years of public teaching, and was the fruit of two years' labour. In the first book he discusses the preliminary training through which a youth must pass before he can begin those studies which are requisite for the orator, and he gives us an elaborate outline of the mode in which children should be educated in the interval between the nursery and the final instructions of the grammarian. The second book treats of the first principles of rhetoric, and contains an inquiry into the essential nature of the art. The subjects of the five following books are invention and arrangement; while that of the eighth, ninth, tenth, and eleventh is style (locutio), with memory and delivery. Of these the eighth and ninth discuss the elements of a good style; the tenth, the practical studies requisite: the rest are occupied successively with memory and delivery. The last, and in the author's view most important, book is devoted to the various requisites for the formation of a finished orator, such as his manners, his moral character, his mode of undertaking, preparing, and conducting causes, the style of eloquence most advantageous to be adopted, the age at which pleading should be begun, and at which it should be left off, and other allied topics. The entire work is remarkable for its sound critical judgments, its purity of taste, its elaboration of the theory of art, and the familiarity it exhibits with the literature of oratory. The condensed survey of Greek and Roman literature with which the tenth book commences has always been admired for its clearness, width of intellectual sympathy, and vigour. Quintilian's own style is excellent, for though he is not free from the love of florid ornament and poetical metaphor characteristic of his age, he was saved from its extremes by his good sense, which refused to sacrifice clearness and simplicity to effect, and still more, by his wholesome admiration for Cicero. The style of Seneca he found fully as offensive to the author as a whole; he denounced it as a dangerous model for the orator to follow. He makes an obvious effort to be fair in balancing his praise and blame, but a careful reader detects an undertone of dislike, whether toSeneca's philosophy or his person. Nineteen longer and 145 shorter Declamations (ed. C. Ritter, 1885), which have been ascribed to him, are now believed to be spurious, as they evidently belong to different authors, and even different epochs.

The best edition of Quintilian's works is that of Bur- mard, a new edition, revised by Spanheim, completed by Zumpt and Bosnell (1798-1834), the last volume (vi.) containing a lexicon, Halm (1868-69), and the hand-edition by Meister (1866-87). Of Book x. alone there are editions by Professor J. E. B. Mayor (1792, incomplete), Hild (Paris, 1885), Froize (New York, 1889), and Principal Peterson (Oxford, 1891). There are English translations by Guthrie (1865) and the Rev. J. S. Waite (1848). See Karl F. Pfaundler, ein Lehrreiche aus der romanischen Kaiserzeit (1863), and C. Ritter, Die Quinlilianischen Declamationen (1881).

Quintus Curtius. See CURTIUS.

Quipu, the language of knotted cords which was used by the Incas of Peru previous to the conquest of their country by the Spanishiards. A series of knotted strings was fastened at one end to a stout cord; the other ends hung free. This was used for the purpose of conveying commands to officers in the provinces, and even for recording historic annals. The colours of the strings and the order of their arrangement, the character and number of the knots, their distance from the cord to which they were connected, and the methods of their interlacing were the principal elements in this "knotty language.

Quirinus (see Mars).—The Quirinal (Lat. Colis Quirinatis) is one of the seven hills of ancient Rome, which contains the Palatine and Capitoline, the oldest and most famous quarter of the city. For Quirites, also, see Rome.

Quisculus. See Grakle.

Qui Tam actions are actions so called in the law of England from the first words of the old form of declaration by which Informers sue for penalties, the plaintiff describing himself as suing as well for the crown as for himself, the penalty being divided between himself and the crown.

Quitch. See COUCH-GRASS.

Quito, the capital of Ecuador, and of the province of Pichincha, lies in 0° 14' S. lat., on the east side of the great plateau of Quito, at the foot of the volcano of Pichincha (q.v.), at an elevation of 9551 feet above the sea. Its site, cut up by numerous streets, is well planned, and the streets are laid out regularly at right angles, plunging into and scaling the sides of the valleys which come in their course. The city is well paved, but the sidewalks are very narrow; and the streets are generally clean, with only a few low thatched lamps—oftenst those placed before shrines at the street-corners. The appearance of Quito is very picturesque, and its beautiful environment of mountains, together with its clear, healthy, and temperate climate, maintaining an eternal spring, renders it one of the most charming cities of South America; yet the abrupt changes from the hot sun of mid-day to the chills of evening make pneumonia and diseases of the chest very common. The chief edifices are built of stone, the others of adobe or sun-dried bricks, covered with tiles. In the great square stand the quaint cathedral, with its green-tiled dome, the bishop's palace, the municipal building, and the capitol, built of brick and stucco, with wine-shops on the ground-floor and the two halls of congress on the third story. Other public buildings include the university, a seminary, an institute of sciences, an astronomical observatory, a museum, a library of 20,000 volumes, a penitentiary with 500 cells, a hospital with 500 beds, a lunatic asylum, a retreat for lepers, a score of churches, and three times as many monasteries. Most of these last are in a very dilapidated condition, for which it is hard to find any explanation but laziness; for they still retain their lands and revenues, and the offerings of the faithful, who are nearly all Indians, are as constant as ever. Indeed, Quito is the paradise of priests—of whom there are more than 400 in the city—and of the Spaniards. Since the conquest of Ecuador is the most faithful province of the pope, and the one state in the world which still refuses to recognise the unity of Italy and the condition of affairs that resulted from the occupation of Rome.

There are only two or three good shops, and no hotels; the daily market in the square before the monastery of San Francisco is the general purchasing-place, and the religious houses serve for hostels. The city boasts a telephone system, but water is still conveyed in great jars borne on the shoulders of porters. There is no manufactures in Quito; there are no card, woollens and beer; the drying of birdskins (humming-birds'), the copying of religious paintings, and the production of images of the Virgin and of saints rank as important industries. Founded in 1534, Quito has frequently
from earthquakes (especially in 1797 and 1854) and from revolutions. Finally in 1877 and 1883. Pop. about 50,000, mainly Indians and mestizos. See Monnier, *Des Andes au Pará* (1890); also Vincent, *Around and About South America* (1890).

**Quit Rent**, a term used to denote various nominal rents; properly speaking, a quit rent is a rent reserved in lieu of all services, because on paying it the holder of the land goes quit and free. In old records it is called white rent, because it was paid in silver money, as distinguished from corn rents. The Conveyancing Act, 1881, empowers an owner of land to redeem any quit rent to which it may be subject.

**Quo Vadis Sacra.** See Parish.

**Quoin** (Fr. coigne, from Lat. eneues) is generally a wedge or an angle. In artillery the quoin is a wedge inserted beneath the breach of a gun, for raising or depressing the muzzle. Quoin, in Architecture, is one of the stones forming the solid corner of a building. Where the work is of brick or small materials the quoins are usually of ashlar.

**Quoits**, a game much practised in many districts of Great Britain, seems to have been derived from the ancient game of 'throwing the discus,' which was such a favourite amusement of the Greeks and Romans. The discus was a circular plate of stone or metal, 10 to 12 inches in diameter, and was held by its farther edge with the right hand, so as to lean upon the forearm, and was cast with a swing of the arm, aided by a twist of the whole body. It was generally thrown edge foremost, and upwards at an angle of 45°, so as to give it as great a range as possible, and the player who threw it farthest was the winner. Sometimes a kind of quoit was used. The modern game of quoits differs very considerably from this. A quoit is a flatish ring of iron, generally about 8 inches in external diameter, and between 1 and 2 inches in breadth; the weight accordingly varies a good deal, but may in any match be fixed beforehand. The quoit is convex on the upper side, and slightly concave on the under, so that the outer edge curves downwards, and is sharp enough to stick into the ground. The mode of playing is as follows: Two pins, called 'hobs,' are driven into the ground from 18 to 21 yards apart; and the players, who are divided into two parties, stand at one hob, and in regular succession throw their quoits (of which each player has two) as near to the other hob as they can. The points are counted as in bowls or in curling. To facilitate the sticking of the quoits at the point where they strike the ground, a flat circle of clay—about 1 or 2 inches in thickness, and 15 feet in radius—is placed round each hob; this requires to be kept moist. The quoit, when to be thrown, is grasped with the right hand by one side, and pitched with an upward and forward jerk of the hand and arm, which give it a whirling motion, and cause it to strike the ground with its edge. Players acquire such dexterity in this game that they can very frequently 'ring' their quoit— that is, land it so that the quoit surrounds the hob.

**Quorn**, or Quorn Don, a village of Leicestershire, 21 miles SE. of Loughborough, gives name to a celebrated kennel (and hunt) of foxhounds. Pop. 1818. See Foxhunting.

**Quorra.** See Niger.

**Quorum** is a legal term denoting a certain specified number out of a larger number as entitled or bound to act for certain purposes. Thus, in statutes appointing commissioners or trustees of a public work it is usual to name a certain number of the whole body as sufficient to discharge the business when it may be inconvenient for all to attend. For the origin of the expression, see Justice of the Peace, Vol. VI. p. 378.

**Quotidian Fever.** See Ague.

**Quo Warranto**, the title of a writ by which a person or corporate body is summoned to show by what warrant a particular franchise or office is claimed. In the reigns of Charles II. and James II. the writ was used oppressively, for the purpose of depriving cities and boroughs of their liberties. At the present day an information in the nature of a quo warranto may be filed, with the leave of the court; disputed questions in regard to municipal offices, &c. are sometimes brought to trial in this way. The information is now regarded as a form of civil process.

**Qurán.** See Korán.
is the eighteenth letter in our alphabet. In ancient Egyptian there seems to have been no clear distinction between the sounds of r and t, both of which are liquid trills, the breath escaping over the vibrating edges of the tongue—in the one case over the tip, in the other over the sides (see L). Consequently the hieroglyphic picture of the "lionsse," from which our letter l is derived, was used almost interchangeably with the picture of the mouth (see Alphabetic), which became the source of the letter r. But the Semites, who obtained their alphabet from the Egyptians, made a clear distinction between the two sounds, and hence the two Egyptian symbols were specialised, the tailed hieratic form of the Egyptian picture of the mouth being exclusively adopted as the Semitic sign for r. It was called resh, "the head," because in the hieratic form, 9, it resembled the oval of the head supported on the neck. In the lapharyngeal writing of the Phoenicians the letter became angular instead of rounded, and the Semitic form, A, passed without alteration into the earliest Greek alphabet. When the direction of the Greek writing was reversed the form was somewhat rounded, giving for the sound of r the symbol P, which was called rhõ. The Semitic name resh or rhōs would become rhōs in Greek, but as in Greek an s normally disappears between two vowels, this would give rhōs, and finally rhō, owing to the coalescence of the vowels. In the primitive Greek alphabet, as in the Phoenician, the forms of the signs for b, d, and r differed little, and confusions arose. Hence the signs were differentiated in various ways. In the early Greek alphabet which found its way into Italy the tail of P was curved round, giving the form R with a lower loop, to denote b; while for d or t or the tail was shortened and finally disappeared, giving D. For r a short tail was added, giving the form R, which ultimately became K, while the form P was retained to represent r in the Eastern alphabet and in the Western to represent p. The tail of K began to make its appearance in the Greek alphabet before it was transmitted to Italy, but subsequently disappeared, other ways of avoiding the confusion between the forms having been invented. For the lapharyngeal and capital forms the old R has been retained, but in minuscule writing we use r and 2, the first of which is an uncial form derived from l; the second, called the r rotunda, coming from the old Roman cursive, in which the vertical stroke of R has nearly disappeared, being represented only by the small tag at the top of r.

The sound of r is a true consonant in the north of England, where it is exaggerated in the Northumberland burr. In Sanskrit it is vocalic; in the south of England it is often reduced to a semi-vowel or even to a vowel; while in the Midlands, in Scotland, and in France it preserves the proper sound of a trilled liquid which it had in Latin and Anglo-Saxon. After a guttural vowel it is hardly heard, farther being now almost indistinguishable from father. The Irish r is a survival of the old English sound, the pronunciation karum for 'harm,' arrum for 'arm,' and boren for 'born,' reproducing, it is believed, the medieval English sound, which is now less resonant than it formerly was. The sounds of r and l are often interchanged. In the Latin alphabet the Semitic symbol for r represents l, and the symbol for l represents r. The Japanese sign for r was obtained from a Chinese sign for l, and some Polynesian and South African peoples replace r by the easier sound of l, as is also done by English children, who, however, often prefer v, saying very for 'very.' The sound of r is usually the last which children learn to pronounce. In English l frequently replaces r and occasionally r replaces l, as in 'turban' from tolbent. Sometimes r disappears, as in 'speak' from E. O. spreyen, 'pin' from O.E. pream, 'paby' from O. Fr. para- lysie, and 'cockade' from O. Fr. cocart. It is intrusive in 'shill' from O. E. schill, in 'boarse' from O.E. hōs, in 'partridge' from Lat. perdix, in 'cartridge' from Fr. cartouche, in 'corporate' from Fr. corporal, and in 'culprit' from Lat. culpae. It is also intrusive in iron and bride-gressive. There is a modern tendency to insert a final r, as in 'tater' for 'potato,' and 'Victoriar' for 'Victoria.' In the words our, your, their, her, the r is a survival of an old genitive suffix. Sometimes r is transposed, as in 'horse' from horses. In Latin r supplants s between two vowels and sometimes at the end of words, as in 'arena' for asena, 'dari' for dasi, 'plurima' for plusima, 'honor' for homos, 'arbor' for arboes.


Raab (Hung. Győr), a town of Hungary, stands on an extensive plain at the confluence of the Raab and the Little Danube, a branch of the great river of that name, 67 miles WN. of Buda-Pest. It contains numerous religious edifices, among which is a beautiful cathedral. The manufactures are chiefly tobacco and cutlery. Pop. 22,951.

Raalte, a town in the Netherlands, in the province of Overijssel, 11 miles NNE. of Deventer. Pop. 5795.

Rasay, one of the Inner Hebrides, lies between the Isle of Skye and the mainland of Scotland, and belongs to Inverness-shire. It is 13 miles in length from north to south, 34 miles in greatest breadth, and 24 sq. m. in area. Pop. (1891) 647; (1891) 438. The western side of the island is bare and uninteresting. On the eastern and more sheltered side there is some striking scenery. Dun Caan (1456 feet) is the highest point, and Brochel Castle, on the east shore—now a mere ruin—the chief object of interest.

Rabanus Maurus (or more correctly Ira- bauus), a great Carolingian churchman and divine, was born of noble parents at Mainz about 776, and had his education at Fulda and at Tours under Alcuin, who summoned him Maurus after the favourite disciple of St. Benedict. He was next placed at the head of his school at Fulda, where he trained scholars like Walfrid Strabo and Otfrid of Weissenburg. In 822 he became abbot, but resigned in 842 to retire to the neighbouring cloister of Petersberg, whence in 847 he
was called to the archbishopric of Mainz. The chief event of his reign was his severity against the too logical monk Gottschalk for his views on predestination. He was a skilful writer, but showed erudition but little originality. They include Commentaries on the Old Testament, St Matthew, and St Paul's Epistles, homilies, doctrinal treatises, hymns, and a Latin-German glossary to the Bible (De Insitutione Clericorum et De Universo Libri xxii., sine Exynothiarum Opus, a kind of encyclopaedia of its time.

His Opera Omnia (so called) fall vols. civii.-cixii. of Migne's Patrologia Curaus Compleutis—a reprint of the Codex Maximus, 1673), to which are prefixed the Lives by his disciple Reudolphus and by Joannes Thirifium. See the studies by Spengler (1586), Kébler (1587) and Ritcher (1582).

Rabat, also called New Sallee, a seaport of Morocco, and one of the most picturesque towns of the empire, is situated on the south side of the Bu-Bagreb, at its entrance into the Atlantic. It stands on cliffs in the midst of gardens, and is overlooked by a large citadel. The most conspicuous object is, however, the tower of Ben-Hassan (180 feet high), rivaling the great towers of Seville (Giralda) and Morocco (Kutubiyah); near it is the residence of the Sultan, which it is intended to be made the largest in the world. Ruins still exist of the sultan's palace that was immortalized by the feats of Dick Whittington's cat. Carpets, shoes, and mats are made, and woollen dyed. But, owing to the sitting up of the mouth of the river, the commerce of Rabat has much declined. Formerly it was the centre of the European trade with Morocco; it still exports olive-oil, grain, hides, flax, wool, maize, and millet. There is a small import of cotton-stuffs, sugar, candles, and tea. 

Rabat, vol. Vi. 35, 1890. See English Illustrated Magazine (February 1890).

Rabbit (Heb. 'my master,' my teacher'), an honorary title of the Jewish Masters of the Law, which is first found applied after the time of Hrodol, subsequently to the disputes between the two schools of Shamaii (q.v.) and Hillel (q.v.). It was in common use in the time of Christ, who is addressed as much by his disciples and the common people. Other titles of the same kind are Rab (master'), Rabban ('our master'), and the Hellenistic Rabboni (my master'). The title Rabban was first given to the grandson of Hillel, Gamaliel (q.v.), as prince-president of the sanhedrim, and was only bestowed by seven other exalted chiefs of schools. At present nothing but the degree of Morenu ('our teacher'), bestowed upon a candidate who proves his erudition in the written and oral law and all its bearings before a college of rabbis, is wanted to render him eligible for the post of a rabbi, which, however, carries no authority whatsoever with it, save on a very few points. It is a mere ignorant error to hold that the rabbi of our day is a kind of 'priest' in the sense of the Old Testament. He is simply the teacher of the young, delivers sermons, assists at marriages and divorces, and the like, and has to decide on some ritual questions. Up to the times of the removal of Jewish disabilities in Europe (see Jews, Vol. Vi. p. 328) he had on some occasions also to give judgment in civil matters. For the later Jewish, or so-called Rabbinic, literature, see Taen. 351 et seq. for Rabbinical Jews and Rabbanites, see the same article, p. 330.

Rabbit (Lepus eucrius), a well-known rodent in the same genus as the hare, from which it differs in some external features and yet more in its habits. The rabbit is smaller than the hare, with shorter head, ears, and legs; the ears are shorter than the head, and have no black patch at their apex, or at most a very small one; the hind-legs are not so much longer than the fore-legs as they are in the hare. They are entirely covered with a very fine grey. Moreover, the rabbit brings forth blind and naked young, which it nurses in the safe retreats afforded by the burrows. These burrows are often of great length, have a crooked course, and generally several openings. Rabbits live socially, and prefer for their warrens places where the soil is loose and dry, and where 'furse or other brashwood affords additional shelter. They feed on grass, herbs, and tender bark. Their reproduction is very prolific, for breeding may occur four to eight times during the year, the period of gestation lasts only thirteen days. The young are born without eyes, nose, and ears, and sexual maturity is reached in about six months. A tame rabbit has been known to bear fifty-eight young in a year, and Pentann calculated that from one mother no less than 1,274,840 descendants might result by the end of four years, assuming that all the members of successive generations survived and reproduced. The young are born—naked, blind, and helpless—within the burrow in a special brood-chamber or nest lined by some of the mother's fur. The mother-rabbit takes much care of her young, nor is the male lacking in affection, though not so great; it destroys the brood. For periods at least rabbits are monogamous, and the males exhibit much affection for their mates and hatred of rivals. The normal length of life seems to be about seven or eight years. The gregarious life of a rabbit Warren needs no description, and may be noted that adjacent burrows sometimes intersect. The senses of rabbits are acute, but their intelligence is not highly developed. They are most active in the gloming and darkness. Their chief enemies are birds of prey such as hawks and owls, and carnivores such as fox and weasel. By stamping with the hind-legs the older rabbits give signals when danger threatens. It is said that the whiteness of the exposed under sides of the tails is of advantage in indicating the direction of movements, but one would think that it must be also disadvantageous in making the rabbit's running more apparent.

Tame rabbits are varieties of the wild form, modified by the artificial selection usually associated with domestication. Among the more important breeds are the 'silver rabbits' with buff-gray silvery fur, the 'Hussars,' the 'Angora rabbits' with short ears and very long silken fur. Albinas with white hair and red eyes are common. The domestic varieties, especially the last, are much less hardy than those which run wild. Some remarkable modifications have occurred among rabbits in which cross-breeding has been prevented by insolation. Thus there are local varieties in the Falkland Islands and in Jamaica. Most remarkable are the dwarf-rabbits of Porto Santo, one of the Madeiras, which are said to be the descendants of a single little rabbit there in the beginning of the last century. These are so much modified that they do not breed with other rabbits. Hybrids between hare and rabbit are not uncommon in France. In regard to the keeping of tame rabbits, it may be noticed that they eat almost any kind of vegetable food, with the exception of cabbage, white roots, celery-tops, carrot-tops, and other produce of the garden, not suitable for human use, are readily consumed by them, as well as chickweed, sow-thistle, dandelion, and many other weeds. When their rabbit enclosure contains a plot of grass and clover it affords them all they require of their food. Great care is requisite to keep their boxes dry, neglect of which, and a too exclusive feeding with green and succulent food, cause
RABBIT

RABBIT-skins have a regular commercial value in consequence of the hair being well adapted for felting purposes; its chief use is in making the bodies of coats and the tails of their felts. It has been a large market in the United States for the imitation furs prepared from rabbit-skins, to which country British manufacturers have largely exported. Tasmania exports about 30,000 rabbit-skins per month to England. See FELT, FUR, HATS.

Rabelais, François. According to those who wrote while his tomb was still standing with his name and age upon it, who had access to the church register of Meudon, and who visited the place of his birth while his memory yet lingered, in order to collect every fact that could be found concerning him, this great humorist was born in the year 1483. His father, proprietor of a vineyard called La Devinière, was an apothecary in the town of Chinon, where his house, which afterwards became a cadet, is still shown. François was the youngest of five sons. Of his elder brothers nothing whatever is known. Bishop Huet, annotator of Rabelais, found an old woman of the name in a village near Chinon, and gathered a local tradition that the last male representative of the family, and apostrophised by their father at the age of 12, was from 1483 to 1533, a disciple of the Franciscan order. At the age of nine the boy was sent to the convent of Soûlié, near his father's estate. 'There are some mothers,' he wrote years afterwards, 'who cannot bear to keep their children about the house more than nine, or, still oftener, seven years, in order to keep them from growing wild.' By that time they had passed over the web and entered into the thicket of their native province. At Scoury, the boy was placed in the hands of a laic brother, to whom he was submitted. Nothing is known about the nature of his scholarship while at La Baunette. We may, however, very well understand, from the continued protection which Jean de Bellay (afterwards Cardinal) extended to him, that as a young man he had shown promise and proved his abilities. At the close of his course._

RABELAIS 541

RABELAIS (1889), the believed there were nine diseases, it is believed they were, until comparatively recent times, confined to the Mediterranean region. It is certain that in Spain, and still more in the Baltic Isles, they did tremendous havoc in the 1st century B.C.; still it seems that bones of rabbits have been found in Quaternary deposits north of the Alps. Rabbits spread very rapidly. In some parts of Scotland they were hardly known in the 18th century, though elsewhere they abounded. Their introduction into Ireland is also recent. They are not able to stand great cold, and are therefore absent from Scandinavia and North Russia. The most signal instance of their rapid distribution is to be found in their present abundance in the United States, and New Zealand, and of the latter of which countries seven rabbits were first turned out near Invercargill, apparently about 1800. As to Australia, the agent-general for New South Wales writes (1891) that this department is unable to state the exact date when rabbits were introduced into the colony, but it is certain that they existed about forty years ago. And according to the Victorian Year Book for 1887–88, tame rabbits were kept in Victoria during the early years of the colony (towards the middle of the 19th century); but rabbits, the pest-tumour of the old world, was brought out on an extensive scale by the emigré proprietor in the western district. They bred rapidly, and for several years there was a demand for couples for breeding purposes in most districts, nobody guessing what a plague they were to become. In both Australia and New Zealand there have been attempts to exterminate them, but the predominance of males might result in unnatural conditions fatal to continued existence. Most practicable at present is the use of wire netting. Thus, if the poles where the rabbits drink are surrounded with netting, thousands die of thirst in a short time. In New South Wales alone the outfall from rabbit destruction in 1883, was over 21,000,000; as many as 27,000,000 have been killed in one year, and their skins paid for. California and Idaho have also suffered severely from the rabbit pest.

Besides eating up crops and pasture, rabbits often do great harm by burrowing among trees, and multiplying to an extent which seriously affects the prosperity of farmers and reapers of stock. The climate and soil are suitable and their natural enemies are few. Many endeavours have been made to exterminate them, but without success. Trapping, poisoning and hunting down by hounds and a temporary reduction of numbers. Pasture proposed to infect them with fowl-cholera, and to some extent this has been tried. It has been lately suggested that only the females should be killed, so that the predominance of males might result in unnatural conditions fatal to continued existence. Most practicable at present is the use of wire netting. Thus, if the poles where the rabbits drink are surrounded with netting, thousands die of thirst in a short time. In New South Wales alone the outfall from rabbit destruction in 1883, was over 21,000,000; as many as 27,000,000 have been killed in one year, and their skins paid for. California and Idaho have also suffered severely from the rabbit pest.

On the other hand, the white flesh of rabbits forms excellent food, the skin and the fur are much used, and, as Gilbert White noticed, rabbits by their nibbling make 'incomparably the finest turf.' The preserving of rabbits in the lap in some places an important industry. Rabbits are not technically game (see GAME-LAWS). The old English name for the rabbit is comy, but the scony of Scripture belongs to the genus Hyrax, anatomically a very different animal.' See HARE, RODENTS.
teries were at that or at any period willing to sacrifice a larger part of a life of servitude and hard labour for one at all. Interest was required for the admission of a boy; in some houses he must be of good birth, in others he must have shown abilities beyond the common. Rabelais, in fact, had no choice at all.

We must derive him at the beginning of his studies. On the contrary, he had access to a large and well-furnished library, whether outside the house or in it is not known, and he read all the books that he could get; acquiring Greek, Hebrew, and Arabic; studying all the Latin authors within his reach. French of the 13th and 14th centuries, books of medicine, astronomy, botany, mathematics—everything in the omnivorous fashion of his time, when every scholar with a good memory wished to become a Doctor Universalis. He had companions in his ardour for learning, especially one of his brother-monks, the Ven. and Archimandrite of the Cistercians, far less severe than those of the Cistercians, permitted the monks to go outside the house, and in the little town of Fontenay Rabelais found a friend, André Tirasqueau, Lieutenant-General of the bullvick, lawyer, scholar, and writer. Also his early and life-long friend, Geoffroy d'Estissac, Bishop of Mauléon, lived chiefly in his chateau of Ermenonv, close to Fontenay.

Many silly stories have been attributed to Rabelais in these years. They all tend to show him in the light of a monkey, mischievous and impudent. We may dismiss them as the fables of Cæsarius; however, that we are to regard him—now a priest—as a person grave and serious, charged with the sense of his sacred responsibilities and his vows: to be a priest in the 16th century is not quite the same thing as to be a clergyman in the 19th. Rabelais was at all times a misanthropic man, more given to laughter than to tears, and if he did not play silly tricks upon the brethren he certainly laughed at them. We find him corresponding with the great Budé, as one scholar with another. He is on terms of intimacy with Tiraquen and his brethren learned the law. He is on terms of friendship with Bishop D'Estissac. Evidently a monk of repute and distinction, he is far above the heads of his nameless and obscure brethren of the monastery. Then we hear of trouble and persecution. The Franciscan jealousy of the old learning has been transformed into jealousy of the new learning. The brothers take their books away from Rabelais and Amy—perhaps lay the pair by the heels in the convent prison.

When they were released a limiting of the convent fell upon these two scholars. What to do? They took a walk of ailes—Virgil—and chanced upon the following line:

_Hae! fuges crudelis terrae, fuges lutas avaram!

What could this mean but a direct injunction to escape? They obeyed the oracle and fled—they ran away. Rabelais, returning to the world, was past forty years of age. He seems to have sought the protection of his friend Bishop d'Estissac, by whom he was received. Through him, or perhaps through the kind offices of Cardinal Du Bellay, he obtained the pope's permission to pass from the protection of the monastery without incurring the penalties of the Inquisition. He then hastened in no hurry to enter another cloister. He remained at Liçugé with the bishop for six years. It is said that during this period he took a small country living, but this is doubtful. Most likely he passed the whole time in study. Perhaps he paid visits to Paris and Bourges. He made the acquaintance of Marot, whose copy of a poem written for his benefit had now ceased to be encyclopaedic: its special aims may be inferred from the fact that on the 17th day of September 1530 he entered the university of Montpellier as a student. That he was already a man, as an artist and a scholar, is proved by the fact that two months afterwards he was admitted to the undergraduate course of three years, was admitted to the Bachelor's degree, and allowed to lecture on Hippocrates and Galen. He dissected publicly before the students, and left the university in the year 1532, returning in 1537 to take the Doctor's degree.

In 1532 Rabelais went to Lyons to get his first book, _Hippocratis et Galeni libri aliquot_, published. He remained there as physician to the hospital. At this time Lyons was as great an intellectual centre as Edinburgh about the beginning of the 19th century. Here the great printer Gryphe had his workshop, and issued no fewer than three hundred books, including the Latin Bible of 1550, remarkable for its correctness and for the beauty of its type, and the commentaries of the French philosophers, the book of Galen, consisting of 1800 columns each, and only eight errata for the whole work. Round this printer was gathered a company of scholars and poets called the Société Angélique, a company of broad thought and advanced opinions. As regards religious opinions, it must be remembered that to the five years of that period the Christian religion meant little more than the Roman ritual and the Roman discipline. They had no idea of Christianity apart from the superstitions they derided. It is not fair to call them atheists: they had adopted the vague but hopelessly romanticizing creed that they would not, being scholars, wholly die: they would, after desiring to be allowed still to watch the advance of learning. Men, for example, who were physicists, like Rabelais, would worship the Creator of the vast and wonderful cosmos. Dolet represents the scholars of Lyons, Desperiers the poets, Rabelais the men of science. All three despised and hated the Church of Rome. Two of them felt the heavy hand of the church in life, the third after death. Dolet was strangled and burned at the stake; Desperiers, starving and despairing, fell upon his sword; Rabelais, dying peacefully, has been assailed ever since as a ballet and a reveiler in foulness and filth.

It was at Lyons that Rabelais began the famous book, or series of books, by which he will for ever be remembered. In the year 1532 he brought out _The Great and Inestimable Chronicles of the Great and Enormous Giant Gargantua_. Every Tournagen knew this good giant. Rabelais had heard about him while a child. It was he who set up the dolmen at Poitiers and the pierre converte of Samour. When he scraped the mud from his shoes he made hills, which he then filled and swallowed six bullocks, a burdened cart, and the driver. Once he swallowed a ship laden with gunpowder. In fact, Rabelais, who never invented anything, but embellished and adorned everything, did not invent Gargantua. In the sequel or second book, _Pantagruel_, the author departed from his first plan: he no longer wrote pure burlesque: serious ideas are set forth side by side with overwhelming nonsense, and the reader steps from unbridled fancy into regions of sense and wisdom. In order to make the first book correspond with the second, Rabelais wrote it in three weeks. But he never changed his style, he was fuller of sense and wisdom than the second. Both books had a prodigious success. They were published under the anagram of Alcôfridas Naisier. At the same time he began his almanac, which
he continued for eighteen years. These are all lost except a few fragments.

In 1534 he accompanied his old friend and patron, Cardinal Du Bellay, to Rome. He promised himself great things on this expedition. He would visit the Italian scholars; he would find new plants; he would dig and discover great things; he would study the frescoes of Raphael; and he returned with Mariani's book on Rome, which he translated and published with notes of his own.

In 1535 new editions appeared of the Gargantua and Pantagruel. In 1536 Rabelais again went to Rome. Some of his letters from Italy to his friend Bishop Fleury have been published, and contain an abjuration from the pope for having forgotten to go into a Benedictine house, for neglecting his Hours, and for practising medicine. He also received permission to go into any Benedictine house which would receive him—time being of course taken to find one. He was enabled to hold ecclesiastical offices, to practise medicine without fees, without the knife, and without fire. He now had nothing to fear from his old enemies of Fontenay le Comte. He amused himself in Italy with collecting curiosities planted by Rabelais France first, and England next, over the melon, artichoke, and turnip-seeds to the bishop and bought curiosities for him. In 1537 he is found in Paris at the great literary banquet held in honour of Dolet's escape from a charge of murder rising out of accidental homicide. From England, where he was with his old friend, he taught at Montpellier. In the latter year he went to Lyons, where he stayed a short time only, removing to Paris in 1540. Once more he made things right with the church, obtaining absolution for not having found a Benedictine house, and permission to enter the Collegiate Chapter of St. Maur des Posses instead of a convent, and to hold any benefits which might be conferred upon him. In 1543 he was at Symphorien near Lyons—where he witnessed the death of Guillaume du Bellay—at Chillon, Ligugé, and Angers.

During this time he was writing his third book. It was a dangerous time for heretics. A whisper of heresy at the outset might not only ruin the book, but also bring the author to the stake. He caused the first two books to be read to the king, who, however, put it upon record that he had not been present with them. He was granted permission for a new edition, and granted a license for the publication of the third. Rabelais did not avail himself of the permission for a new edition. Already many impieties had been pointed out which he declared were due to the printers, interpolated and so forth. Best not to bring out a new edition. But he printed his third book. This was in 1546.

In 1547 the old king died, and a reaction against liberty of thought immediately began. They attacked Rabelais. Not content with finding impieties in the first three books, they printed a thing which they called his fourth book. Rabelais fled: he went to Metz, where he practised medicine. Cardinal Du Bellay, himself suspected of liberal tendencies, withdrew to Rome, whither he called Rabelais. On the birth of King Henry's eldest son great rejoicings were held in Rome. Rabelais wrote an account of these, and sent the little book to the Cardinal De Lorraine, a stroke of policy which enabled him to return, and gave him the living of Membon.

From both sides, Catholic and Protestant, cries came that his book should be suppressed and the author burned. Nothing, however, was done. But Rabelais did not dare to proceed further with the fourth book than the eleventh chapter. There it broke short off. This was in 1549. The author, now growing old, lived quietly at his living, preached, catechised the children, and led an exemplary life.

Early in 1558, a fortnight before the parliament allowed the sale of the book, he resigned his living, and went to Paris. Here, two months afterwards, he died. It was in the Rue des Jardins, parish of St Paul. They buried him at the foot of a tree, on which his name was carved. The tree was cut down a hundred years afterwards. Ten years after his death appeared the fifth and last book, which had been left in MS., unfinished and without the author's corrections.

These are the facts which have been gleaned concerning the life of this great humorist. The riotous license of his mirth, which is restrained neither by decency nor by reverence, has made him as many enemies as his wisdom has made him friends. This fault, which Rabelais shares with many writers of his age—our own dramatists were quite as bad—has been made the most of by the former, his enemies. We may grant the blot; yet it is not inherent in the book; it is not woven in the web: and when it is removed there remains the most astonishing treasury of wit, wisdom, common-sense, and satire that the world has ever seen. All, however, assumes the form of allegory: those who have no taste for allegory cannot appreciate Rabelais.

Among the many modern editions of Rabelais may be named those of Lacroix and A. De Montaiguon (3 vols. 1888-73), that in the 'Collection Jannet' (7 vols. 1867-74), the Jouest edition (4 vols. 1885), and especially that in the 'Collection Lemercier,' by Ch. Van Hout, Laveaux (in 6 vols., i. to iv. 1886-81). See Daedalus, Rabelais (Paris, 1881); Lacroix, Rabelais, son Vie et ses Oeuvres (Paris, 1886); Flouery, Rabelais (2 vols. Paris, 1874); Urenhart and Metteau's English translation (1893-94, suppressed, but often reprinted); the present writer's Rabelais (1879), and his Routings in Rabelais (1881); Stapfer, Rabelais (1880); Heuillard, Rabelais: ses Voyages et Bastlie, son Ezai a Metz (1881); René Millet, Rabelais ('Grands Ecritains,' 1893).

Rables. See Hydrophobia.
Rabshakeh, an officer of the king of Assyria, the name of a person; but apparently an official title, presumably that of the chief cup-bearer.
Rabutin, or Bussy-Rabutin. See Sévigné (Madame de la Sablière).
Rahouant, a farinaceous food prepared from certain acorns. See Oak, Vol. VII. p. 561.
Racalulto, a town of south Sicily, 13 miles by rail NE. of Girgenti. Pop. 13,133.
Racconigi, a town of North Italy, 23 miles by rail S. of Turin, with a royal palace. Pop. 7,875.
Raccoon, or Raccoon (Procyon), a genus of quadrupeds of the Bear family (Arctoida), with six molar teeth on each jaw; like other Arctoids, it is plantigrade, and has no retractile claws. There
are certainly two, possibly three, but not more than four species of racoon, which are restricted to the United States, and to the north of America we meet with the 'coon' ('Procyon lotor'), so called from the habit of soaking its food in water. This animal prefers open woods, and is a good climber, making its home in trees. The raccoons, however, descend to the ground to search for their food, which consists chiefly of nuts, fruits, crayfish, and various shellfish; they will also feed upon corn. These animals are among the most strictly nocturnal of mammals; they hibernate during the winter. In South America occurs P. cencerurus, and a well-marked variety which may be called P. canescens, and named P. nigripes on account of its dark-coloured feet. For the Raccoon Dog, see Dog.

Race. See Breed, Species, Ethnology.

Race, Cape. See Newfoundland.

Racehorse. See Horse, Horseracing.

Raceme. See Inflorescence.

Racemic Acid. See Tartaric Acid.

Rachel, Elisabeth (properly Eliza Rachael Félix), a great tragic dramatist, was born in London, the daughter of Irish Jewish parents at Muni, in the Swiss canton of Argang, 24th March 1821. At last the family settled at Lyons, and here Rachel and her sister Sarah used to sing for chance gratuities at the streets and cafes. About 1830 the household was transferred to Paris, and here Etienne Choron gave her her first lessons in singing, Saint Aubaine in declamation; but later it was Sançon from whom she learned most. Mademoiselle Mars divined her genius, but it was not till Véron and Jules Janin had written glowing criticisms that she took the playing world of Paris by storm. She made her first appearance at the Gymnase in the Vendémiaire in 1837 with moderate success, but on 12th June 1833 she appeared as Camille in Les Horaces at the Théâtre Français. From this time forward, in the great parts supplied by the classic masterpieces of Corneille, Racine, and Voltaire, she shone without a rival; her fame may be said to have culminated in her appearance as Phèdre in Racine's tragedy in 1843. In Adrienne Lecourte, a piece expressly written for her by MM. Legouvé and Scribe, she had also immense success, though in other modern parts her popularity was somewhat less. The furore excited in Paris in 1848 by her public recitation of the Marseillaise will continue to connect her name with the history of the Revolution. In 1849 she made the tour of the French provinces; before or afterwards she also visited London, Belgium—where Charlotte Brontë saw her—Berlin, and St. Petersburg, everywhere meeting with enthusiastic applause. Her health now began to fail; in 1853, in the course of a professional visit to America, it altogether gave way, and she returned utterly prostrated. A residence at Cairo, Egypt, where her father, a Judge, had previously been appointed to a professorship, was recommended; and on the 3d January 1858 she died at Cannaq, near Toulon. As an artist, within the limits prescribed by her genius, Rachel has probably never been quite equalled. Of the burning intensity which characterized the rendering of passion in her fiercest concentrations no words can give an adequate image. She does not act—she suffers, one observer well said of her. Her Phèdre—by common consent her masterpiece—was an apostasy of human agony, not to be forgotten by any one who ever witnessed it. In character Rachel was neither exemplary nor altogether amiable. She gave her first love to a Jew, who used her shamefully, publishing her letters after the rupture; in 1844 she bore a son to Count Walewski, himself a son of Napoleon by a Polish mother. In her professional relations she was notoriously grasping and avaricious, although she could be royal in her affections. Her family, and heaped them with the wealth that she had gained. Her immense popularity enabled her to dictate her own terms to managers, and of this power she is said to have availed herself without scruple or generosity. She made over four millions and left one and a half million of francs. Her elder sister Sarah (died 1877) failed as an actress, but lived to make a fortune by the sale of the cosmetic 'eau des fées.'

See J. Janin, Rachel et la Tragédie (1858); D'Heyri, Rachel auprès de sa Correspondance (1882); and the Life by Mrs. Algernon Ainslie (1895).

Racine (Gr., 'backbone'), in Botany, the primary floral axis, an elongation of the stem or of a branch, from which arise the flower-stalks (peduncles), or to which the flowers are immediately affixed.

Racine, capital of Racine county, Wisconsin, is situated on Lake Michigan, and on both sides of Root River, which is crossed by five swing bridges, and where the town has its name from its situation at the mouth of the river. By rail the city is 62 miles N. of Chicago and 23 S. of Milwaukee; and in summer there are daily steamers to Chicago and the north. Racine contains a lansdowne post-office and city hall, a hospital, the Toynbee Asylum and the University of the North-west (Episcopal) founded in 1852, and formerly called Racine College. A large trade is carried on in lumber, and, besides flax, flour, and woolen mills, boiler-works, and lined-oil-works, there are manufactories of ploughs, pumps, wagons, Iimming-mills, iron-works, work, cartage, furniture, refrigerators, boots and shoes, rubber clothing, &c. Top. (1850) 16,031; (1900) 29,102.

Racine, Jean, the greatest tragic dramatist of France, was born at La Ferté-Milon, in the modern department of Aisne, in December 1639, and was baptised on the 22d of that month. His father was a procureur or solicitor by profession, and held, like his father before him, the office of comptroller of salt at La Ferté. His mother died while he was still a child, whereupon his father married again, but soon after died also. The boy was taken care of by his maternal grandfather, and was sent for his education to the college of Beauvais, whence he passed to Paris. In October 1653, being indeed, closely connected, both on the father's and mother's side of the family, with the famous abbey. Here he studied hard under the especial care of Claude Lancelot, Nicole, and Le Maître, and at an early age discovered a faculty for verse-making and, still worse, a liking for romance that caused his good teachers no small uneasiness. He was almost nineteen when he left Port Royal to pursue the course of philosophy at the Collège d'Harcourt, and here he appears to some extent to have exchanged the severity of his Jansenist upbringing for the lenity of the moral life, and as to have first felt the attraction of the life of letters. Naturally he became estranged from his Port Royal friends, who saw spiritual ruin in his worldliness and his intimacy with the abbored actors and actresses. Meantime he had written an ode, La Nymphé de l'Amour, on the marriage of Louis XIV., finished one piece and began another for the theatre, and made the acquaintance of La Fontaine, Chapelain, and other men of letters. About this time he lived a while under the care of his cousin, N. Vitart, fifteen years his senior, and gave him some kind of assistance in his work as financial secretary to the Due de Luynes. Many letters of this period to Vitart, the Abbé Lo Vasseur, and La Fontaine are extant, and show how the lessons of Port Royal were falling into
forgetfulness, as his true vocation opened itself up before his eyes. The great dispersion of the solitaires of Port Royal took place in 1661, and, from Racine’s contemporary letters to the Abbé Le Vaillant, clearly before 1668. In February of 1668 he went to Uzès in Languedoc, hoping, but in vain, to get a benefice from his maternal uncle, the vicar-general of the diocese, and here he divided his time between St Thomas, Virgil, and Ariosto. Again in Paris before the beginning of 1664, he obtained a copy of Molière’s Henri le Grand. His wished to be the king of six hundred frames for a congratulatory ode. But indeed he received almost to the end of his life handsome rewards in money—‘gratifications’—from the court. An ode of gratitude to the king for one of these, La Renommée aux Muses, gained him the life-long friendship of Boileau, and from about this time began the famous but much over-estimated friendship of ‘the four’—Boileau, La Fontaine, Molière, and Racine. Unfortunately from about this point there is a break in his correspondence, so that we lack satisfactory evidence about his most doubtful and, at the same time, interesting points in his career—his singular struggle against Molière, his bitter attack upon Port Royal, and his final conversion and retirement from dramatic work. His earliest play, La Thébaïde ou Les Hémonides, was produced at the Royal Academy of Letters, and he was sent from the Hôtel de Bourgogne—a fact which of course involved a complete break of friendship between Molière and himself. This famous quarrel is difficult beyond most to clear up, but there is at least light enough to see that the wrong did not rest with Molière. Racine showed himself as hostile to Corneille, most probably only because the other had the advantage of a more active and less central a rôle. But he soon plunged into a yet more discernible quarrel. Stung by one of Nicole’s Lettres Visionnaires (January 1666) condemning the romancer or the dramatic poet as an ‘enpoisonneurs public’ in accordance with the ethos of his own art, Racine published a savage and stinging letter to the author, in which he heaped disgrace on his own head by indecent personalities upon Nicole and even his dead teacher Le Maître. Boileau’s advice alone saved him from further staining his own reputation. ‘This letter,’ said Boileau, ‘may do credit to your intellect, but certainly none at all to your heart.’ Later in life Racine himself said he would give his heart’s blood to wipe out the most disgraceful blot on his life. His repentance made noble atonement for the wrong—as for the literary quality of the letters, for brilliant wit and delicate irony they were not unworthy of the hand of Pascal.

During the next thirteen years Racine produced his greatest work, seeking relaxation from labour in at least one liaison with an actress. His plays followed one another in a stream of glowing character Hermione; Les Plaideurs (1668), a delightful little comedy of satire against lawyers, which Molière was the first to appreciate; Britannicus (1669), which Voltaire styled ‘la pièce des connaissances’; Bérénice (1670), an unconvincing and uncostumed contrast with Corneille, the story of which had been given to both poets by Henrietta of Orleans; Boisjuzet (1672), admirable, but anything rather than oriental; Michielide (1673), produced almost at the moment of his admission to the French Academy; Lapétraie (1675), a master-piece of pathos; and Phèdre (1677), a marvellous representation of human agony, which afforded a subject adequate even to the powers of Rachel. With the last ended abruptly his thirteen years of unbroken playwriting. A few days after its production the Troupe du Roi introduced an opposition Théâtre, by Plauche, which, though worthless by comparison, was eagerly supported by a powerful party, partly political. The next November 1668 he was made a member of the Académie Frangaise. Whether from disgust and mortification, or from the conversion attributed to him just at this period, Racine turned at once from dramatic work, made his peace with Port Royal, married on June 1, 1677, and settled down to twenty years of domestic life. His wife, the most beautiful woman in the court, bore five children—three daughters and two sons—and he himself had found ample profit in the drama, besides enjoying an annual gratification that grew gradually from 800 to 2000 livres, not to speak of the office of treasurer of France at Moulins, at least one benefice, and one from 1677, jointly with Boileau, the office of historiographer-royal of France, with a salary of 4000 livres a year. The last involved the duty of accompanying the king on several of his expeditions, but in the case of both poets broke little historic fruit beyond a crop of good interpreters and a few sagas. In January 1685 Racine emerged from his retirement to pronounce the discourse at the reception to the Academy of Thomas Corneille, and at last did himself honour by his admirable enlouage upon his greater. In 1689 he wrote Esther, in answer to a request from Madame de Maintenon for a play suitable for her girls at Saint-Cyr. She had tried Andromaque, but found that the girls acted it ‘a great deal too well.’ Its success was great, but entirely warranted by the year’s most solid and technical work. Atlantide followed in 1691 with much less success, though it perhaps deserved even a greater. Four cantiques spirituelles, and an admirably written Histoire abrégée de Port Royal, make up the whole remainder of Racine’s literary work. In his later years he lost the favour of the king—how long by any means clearly understood. He is said to have prepared a memoir on the miseries of the people, and the king, finding Madame de Maintenon reading this, expressed his displeasure in some harsh words that were not published. On 4th March 1698 he wrote a long letter to Madame de Maintenon, to clear himself from the crime of Jansenism, but he never recovered the king’s favour, and his entire mortification appears to have hastened his death. He said to Boileau, who was old enough to be his father, ‘You may be right, boileau, ‘may do credit to your intellect, but certainly none at all to your heart.’ Later in life Racine himself said he would give his heart’s blood to wipe out the most disgraceful blot on his life. His repentance made noble atonement for the wrong—as for the literary quality of the letters, for brilliant wit and delicate irony they were not unworthy of the hand of Pascal.

In France it remains an article of patriotism to claim Racine as the greatest of all masters of tragic pathos, yet this estimate does not very greatly exceed the truth. He took the conventional French tragedy from the stronger hands of Corneille, and added to it all the grace of which it was capable, perfecting exquisitely its versification and rhetorical style in conformity with all the whole action to the central idea of the one dominant passion. But he was a far greater poet even than a dramatist, and the tender sweetness and beauty of his rhythm, the finished perfection and flexibility of his verse, with their old-world while yet ever present stamp of distinction that informs his style, combine to add a charm of its kind beyond anything else in the whole poetry of France. It may be that the highest poetry of all is beyond his reach, and that his verses are not for a sensitive ear, but such they haunt with a peculiar charm beyond the art of a Lamartine or a Hugo. Within its limits his poetry attains the perfection of the classic in the highest as well as severest sense of the term; it sums up in its
content all that was noble in the royalism of the 18th century, and in the spiritual aspirations out of which grew a Mère Angélique and a Pascal; and it attains the Olympian height of distinct originality as well in the balanced proportion and harmony of all its elements, the grandeur and sublimity of which it is capable of rising in a Pâraide, an Esthér, and an Athalie. These high creations transcend and crown with the glory of completion his habitual tenderness and beauty, but into this empyrean also the poet soars no less naturally on the same wing of ease and steadiness. Voltaire, once asked to write a commentary on Racine, answered, and with truth: "Il n'y a qu'à mettre au bas de toutes les pages—beau, pathétique, harmonieux, admirable, sublime."

The first collected edition appeared 1675-76; the last within his life-time in 1697. Of more important editions may be named the splendid folio of 1850, those of La Harpe (with commentary, 1807), Geoffroy (1808), Aimé Martin (1829), A. France (5 vols. 1874), and especially the splendid edition by Paul Monard in "Les Grands Écrivains de la France" (8 vols. 1865-73). The first volume of the last contains a Life; the eighth, a Lexique by Marty-Levaux. Of English translations are the Distinct Life of the Author, by Richard Pococke (1750); the Principal and Historical Events of the Inquisition by Edmund Smith, brought out at the Haymarket in 1707; and a complete motteau version by R. B. Bowell (vol. i. 1899; vol. ii. 1891). See vol. vi. of Sainte-Beuve's Port Royal, and vol. i. of Portraits Littéraires also Henry M. Trollope's Corneille and Racine, in the series of Foreign Classics.

**Racing.** See Athletics, Horse-racing, Rowing, Yachting.

**Racket,** an instrument of Torture (q.v.) used for extracting confessions from actual or suspected criminals, consisted of an oblong frame of wood, with a windlass arrangement at each end, to which the sufferer was bound by cords attached to his arms and legs. The unfortunate being was then stretched or pulled till he made confession, or till his limbs were dislocated. The rack was known to the Romans in Cicero's time, and in the 1st and 2d centuries A.D. was applied to the early Christians. According to Coke, it was introduced into England by the Duke of Exeter, Constable of the Tower in 1447, whence it came to be called the "Duke of Exeter's daughter." Its use first became general about 1419, for, in 1421, the Act of the 11th of Henry VI. I., to which it could only take place by warrant of council, or under the sign-manual. Under Elizabeth it was in almost constant use. In 1628, on the murder by Felton of the Duke of Buckingham, it being proposed by Charles I. to put the assassin to the rack, in order that he might discover his accomplices, the judges resisted the proceeding as contrary to the law of England. In various countries of Europe the rack has been much used both by the civil authorities in cases of traitors and conspirators, and by the Inquisition to extort a recantation of heresy, which is no longer in use in any part of the civilised world.

**Rack-a-rock.** See Billiards.

**Rackets** (or **Racquets**; M.E. racket; Span. raqueta, "racket," "battle-lore;" Arab. rakbat, "palm of the hand"). No reference is made to the game of rackets before the early part of the 19th century, and the game as then played differed materially from that of the present day. From 1821-22, however, in the porch of the Parish Church of Rackett, in Wiltshire, we find the word "rack" and the sport of "racketing" used to describe a game resembling the modern tennis. As late as 1825, the Rules of the Game of Racket published by Hope give the following: "The number of players shall not exceed two, and the ball shall be played against a single wall, the players having to come into a court marked out with paint. The score is decided by a simple majority; and if the ball strikes the wall, the players have to return it by a stroke without leaving the court, and the game is at the discretion of the player who last struck the ball in the play." The game was soon dropped, as it was considered a novelty, and the old game of court and ball came into favour, and since covered courts have been adopted by the universities and public schools the old game has become practically obsolete. When the site of Prince's Club was invaded by the builder in 1886 the headquarters of rackets were transferred to the Queen's Club, Kensington, where championship matches have been instituted, and where the university and public school contests now take place.

The modern court is about 60 feet long by 30 feet broad and 40 feet high. It is enclosed by four walls, and covered by a roof with a double row of skylights. The walls and floor are coated with cement, usually coloured black, and marked out by white lines as shown in the plan. A line 8 feet from the ground painted across the front wall is called the 'service line.' Below this at 2 feet is the 'play line,' which is made of wood, so as to enable the players to judge by the sound whether a ball jup or not. The racket has a small head with tightly strung gut and a long handle. The average weight is 9 oz. The ball is very hard, and about 1 1/2 inch in diameter. The server strikes the ball alternately from the two serving boxes a and b in such a manner that it flies direct from his racket to some part of the front wall above the service line, and rebounds into that quarter of the court opposite to him—viz. from a into A, from b into B. If the ball hits the wall below the play line, or goes out of court, the server's "hand is out," and his opponent has the privilege of serving. If it strikes the wall between the play line and the service line, or falls on some part of the floor other than that indicated, it is a 'fault,' and the server may refuse to take it. Two faults put the hand out. The server must return the service above the play line. The game consists of fifteen aces, and the server scores an ace when the striker out fails to return his service or any ball in the subsequent 'bally.' See Tennis, Lawn Tennis, Rackets, and Fives, in the 'Badminton' series, by J. M. Heathcote and others (1899).

**Racocy.** See Racocky.

**Racoon.** See Raccoon.

**Racocka,** the fur of the Coypu (q.v.).

**Racock,** a village in the south of the Polish government of Radom, in the 18th century a centre of Polish sympathisers, who printed here their Catechism (q.v.). Pop. 2109.

**Radcliffe,** a town of south-east Lancashire, on the Irwell, 2 miles SSW. of Bury and 7 NW. of Manchester. It has an ancient parish church (restored 1873), a ruined tower, a market-hall (1852), a co-operative hall (1878), cotton and cotton works, bleachfields, and coal-mining in the neighbourhood. Pop. (1851) 5002; (1881) 10,207; (1891) 29,020.

**Radcliffe, Ann,** novelist, was born in London, 9th July 1764, of respectable tradespeople with good connections. Her maiden name was Ward, but in her twenty-third year, at Bath, she married William Radcliffe, a graduate of Oxford and sometime student of law, who became proprietor and editor of the weekly *English Chronicle*. She took
to writing to pass the time when alone, and as early as 1789 published The Castles of Aitkin and Doncaster, which was followed by Sicilian Romance (1790), The Romance of the Forest (1791), The Mysteries of Udolpho (1794), and The Italian (1797). For the last she received £800; for its predecessor, £500. From this time she published no more novels like an actress in full possession of her applauded powers,' says Scott, 'but chose to retreat from the stage in the full blaze of her fame. She travelled with her husband abroad and all over England and Wales, and the jottings in her journal show how keen an eye she had for natural scenery, and how she shot up her narrative with ruined abbeys. She was a modest and amiable woman, who did not publish herself nor sink the gentlewoman in the writer. So little was she known to the public that in her own lifetime there was widely current an absurd story that her mind had given way under the horrors; Crabbe Holingson preferred her stories to Waterlow; and so sagacious a writer as Dunlop could write, 'life has few better things than sitting at the chimney-corner in a winter evening and reading such absurdities.'


**Radcliffe, John**, physician, was born at Wakefield in Yorkshire, in 1659, and studied at Oxford, passing M.A. in 1672, and M.B. in 1675. Beginning practice, he immediately saw himself conscious by the originality of his ideas, claiming to take nature for his guide, and in less than two years was on the high road to celebrity. In 1692 he became M.D., and in 1694 removed to London, where he soon became the most popular physician of his time. It is said that his conversational powers, ready wit, and pleasantry contributed to the result quite as much as his professional skill. In 1696 the Princess Anne of Denmark made him her physician; and after the Revolution he was selected by William. In 1694 he was called upon to attend Queen Mary, when attacked by the smallpox, and did what he could to save her, but in vain. In 1713 he was elected M.P. for Buckingham. He had a country-house at Carshalton, and here he was living in 1714 when Queen Mary was attacked with what proved to be her last illness. Dr Radcliffe was summoned to attend her; but he was ailing, and either could not or would not come. The queen died in August; and the populace were so enraged against Dr Radcliffe that he dared not again show his face in London. He must have been really ill when sent for to the queen; he died of apoplexy at Carshalton on 1st November 1714, and was buried at Oxford in St Mary's Church. He bequeathed the bulk of his large property to a public use; leaving £40,000 for the erection of the Radcliffe Library, whose books were transmitted in 1861 to the University Museum; while the building now serves as a reading-room for the Bodleian (q.v.). Other bequests were made to University College and St Bartholomew's Hospital, London.

**Radcliffe, See Derventwater.**

**Radcliffe, John, Joseph, Count, an Austrian field-marshal, was born at Trzebnitz Castle near Tabor in Bohemia, on 2nd November 1766. Entering the Austrian army in 1784, he made his first campaign against the Turks in 1788-89, and afterwards fought in nearly all the wars waged between the Lombaro-Venetian territories, and five years later was made general marshal. In the people of Lombardy rose in revolt against Austrian rule in 1848 Radetzky, an old man of eighty-two, after five days' street fighting, was driven out of Milan. Concentrating in Verona and Mantua, he proved the chief staying-power of the House of Hapsburg during the 'year of battles in Italy. Nevertheless he was defeated by the king of Sardinia at Goito on the Mincio, when marching to the relief of Peschiera, in May. Peschiera capitulated immediately afterwards. Having received heavy reinforcements, Radetzky towards the end of July broke out of Verona, routed the Sardinian-Piemontese army at Castozza, and on 6th August re-entered Milan. Three days later an armistice was concluded, the king of Sardinia abandoning all places east of the Ticino. On the resumption of hostilities in March 1849 the Austrian general in a campaign of less than a fortnight crossed the Ticino and almost destroyed the Piedmontese army at Novara (23rd March). In the following August he compelled Venice to surrender, it having been in revolt since 1848. After this Radetzky was appointed governor of the Lombard-Venetian territories, and led them with an iron hand until the beginning of 1857. He died at Milan on 5th January 1858, and was buried at Metzdorf near Vienna.

See his own Denkschrift (1867) and his Briefe an seine Tochter. He was the father of Krones, Strack (1849), Schneidewind (1851), Schönlaub (1858), Trubetzkoi (1860), Kunz (1900), K. von Duncker (1891), Smolle, Krones, Grasser, Bancalari (1892), and Hübner, Der Anzeiger der Prov (1891).**

**Radhanpur**, chief town of a protected state in Bombay Presidency, India, 150 miles N.W. of Baroda. It is surrounded with walls and encloses a fortified castle, the residence of the native prince. Pop. 14,722. The area of Radhanpur has an area of 1150 sq. m. Pop. of 12,950.

**Radient Energy.** See ENERGY

**Radient Matter.** See VACUUM TUBES.

**Radilata**, one of the four embranchments into which Cuvier (1812) divided the animal kingdom, the other three being Articulata, Mollusca, and Vertebrata. In the division Radilata Cuvier recognised five classes—viz. (1) the Echinodermata, (2) the Entozoan (or Entozoon Worms), (3) the Arachnidae (or Jolly-fish), (4) the Polypida (Hydroids and Polyzoa), and (5) the Infusoria (Rotifers and Protozoa). It is hardly necessary to say that this exceedingly heterogeneous assemblage, or 'radiate phyla,' as Huxley termed it, is now broken up into numerous distinct classes.

**Radiation.** See HEAT.
Radical, in Chemistry, is a term applied to a group consisting of two or more elementary atoms which is capable of entering into a series of different compounds without itself undergoing change or decomposition. In this respect a radical resembles an atom of an elementary substance. Radicals are, in a sense, incapable of a separate existence, and must be in combination with other radicals or elements. Two similar radicals can, however, combine with each other, and in such cases the combined product has been looked upon as the radical in the free state. The radical methyl, CH₃, consisting of one atom of carbon and three atoms of hydrogen, is known in combination with chlorine, iodine, oxygen, and sulphur in the respective compounds, methyl chloride, CH₃Cl, methyl iodide, CH₃I, methyl oxide, (CH₃)₂O, and methyl sulphide, (CH₃)₂S.

Two methyl groups occur in combination with each other in the substance ethane or dimethyl, (CH₃)₂H. A very large number of other compounds contain the radical methyl.

The nitrates, the nitrites, and the acetates contain the respective radicals SO₄, NO₃, and C₄H₉O. These are frequently called the salt-radicals of the respective series of salts. In double decompositions the salt-radical occurring in combination with one metal is transferred, without decomposition, to another metal. For instance, the equation

\[ \text{MgSO₄} + \text{Ba(NO₃)₂} = \text{BaSO₄} + \text{Mg(NO₃)₂} \]

represents the mutual exchange of salt-radicals by the metals magnesium and bariuin.

In chemical notation short symbols are frequently employed to represent complicated radicals. Thus, the complex salt-radical of the tartrates, C₄H₉O₆, is shortly represented by the symbol T. Tartaric acid is then represented by H₂T, potassium tartrate by K₂T, potassium hydrogen tartrate (cream of tartar) by KHT, &c.

Radical, in English politics, is often used to denote the advanced wing of the great Liberal party. The name seems to have been first used in the reign of George III. in the phrase ‘radical reform’ (Anti-Jacobin, 1797 and 1798), though one instance at least occurs much earlier in the Remains of Archbishop Leighton, written in the reign of Charles II. (see Root AND Branch Men). But the modern radicals are descendants of the French Revolutionists of 1789. The principal objects of the men so designated have been chiefly concerned with parliamentary reform, the extension of the franchise, the enlargement of the public privileges of the people, and with endeavouring to weaken and curtail the exclusive privileges and prerogatives of the oligarchical ruling classes. In a word, the radicals of England have been the pioneers of the democratic movement, and have sought to achieve their ideals almost exclusively through the agency of parliamentary government. The word is meant to indicate the thoroughness of the reforms advocated, being derived from the Lat. radix, ‘a root.’ Inseparably associated with the great reform movements of the 19th century, the radicals began to be generally so called about 1816; and the name figured prominently in the movements in which Orator Hunt (q.v.), Thistlemwood, Watson, and others played the chief parts. A clever poem setting forth the nims of these men, entitled The White Hat (1819)—i.e. the hat of Hunt, nicknamed King Harry the Ninth—and written by J. W. L. Swire, will be found in Notes and Queries, series 3, vol. x. p. 436. See also W. Harris, History of the Radical Party in Parliament (1885); and S. Bamford, Life of a Radical (1842).

Radiolaria, a class of marine Rhizopod Protozoa. Thread-like processes of living matter radiate outwards on all sides; a membranous capsule with fine pores, or with one or more sertapines, separates an internal unclotted region of the cell from an outer part supported by a gelatinous framework; there is a hard skeleton of silica or of a ‘horny’ material called acanthin. They multiply by dividing or by forming spores within the central capsule. Most of the Radiolarians are minute, under \( \frac{1}{4} \) of an inch, but a few which form colonies may measure an inch or even 4 inches in length. Most of them include ‘yellow cells’ or algae, with which they live in a partnership known as Symbiosis (q.v.). Radiolarians occur in all seas, in every latitude, and at all depths, though many kinds predominate on the surface, where they are, wafted about by currents. The siliceous skeletons form most of the ooze which has been dredged from depths of 2000 to 3000 fathoms. Fossil forms are abundant in certain deposits—‘Barbadoes earth,’ ‘Tripoll powder,’ and various marls, &c. See Haeckel, Report on the Radiolaria (Challenger Reports, xvi., 1857).

Radiometer, an instrument consisting of four horizontal arms of very fine glass, carefully poised so as to revolve easily on a point; the tips of the arms having pith discs blackened on one side. The whole is contained in a glass vessel almost but not quite exhausted of air. When exposed to light or heat the arms move round, more or less swiftly according to the strength of the rays. The blackened sides of the vanes are warmer; the molecules of air striking those sides are more heated by the vanes; they rebound after impact with greater velocity; the vanes are driven back by a greater recoil on the blackened sides. The radiometer was invented in 1873-76 by Crookes (q.v.).

Radiophone, an instrument, essentially similar in principle to the Photophone (q.v.), for producing sound by means of heat rays.

Radish (Raphanus), a genus of plants, of the natural order Cruciferae, having a spongy Silique (q.v.). The flowers are yellow, red, or purple. The Common Radish (R. sativus) has thick, round, tapering, and pointed pods, little longer than their stalks, very slightly contracted between the seeds, and not falling to pieces. It is not known in any country in a wild state, but has been cultivated from time immemorial in China, Japan, India, and in Europe. But some varieties of the Wild Radish found growing on the Mediterranean coasts resemble...
so closely the Garden Radish as to suggest the possibility that the latter may be but a cultivated race of it. Radish is a well-known salad root, much appreciated for its succulent roots with their warm pungent flavor. In this respect young and tender leaves were also formerly used. The varieties of radish in cultivation are extremely numerous, but they are generally classified under the two heads of Long-rooted and Turnip-rooted Radishes, the roots of the former resembling the carrot in shape, and the latter the turnip. The varieties differ very much, not only in form of root, but in colour and size, a red colour generally prevailing. Some of the darker-coloured turnip-rooted radishes, such as the black Spanish, grow to a large size under good cultivation, and are grown in gardens chiefly for their root; and the surface generally is not grown. Radishes are sown at different seasons, and are generally used when young and small. The root of the radish possesses demulcent, stimulant, and diuretic properties, and is sometimes used in cases of atony, or of excessive secretions of mucus by the organs of respiration and the primary organs. Radish-juice, mixed with sugar-candy, is a popular and useful German remedy for hoarseness and cough. Distinct from both the varieties above named is the Oil Radish, which is a nearly fleshy-rooted, short, much-branched stem, and many-seeded pods. It is cultivated in China for the oil of its seeds. Another species of radish (R. caudatus), a native of Japan, is there cultivated as an esculent. To this genus belongs the Jointed Charlock of the cornfields (R. raphanistrum), which has found its way from Europe to North America, and is a troublesome weed there also. The seeds, however, may be advantageously crushed for oil. The Sea Radish (R. maritimus) is a rarer British species, the roots of which are of fine quality and great pungency.

Radius. See CIRCLE.

Radley, a Berkshire village, near the right bank of the Thames, 5 miles S. of Oxford. The Bowyers' seat here was in 1847 converted by Professor W. Sewell into a High Church public school—St Peter's College—for 130 boarders. It has a fine chapel.

Radnorshire, a border county of South Wales, bounded by the counties of Montgomery, Salop, Hereford, Brecon, and Cardigan. Measuring 30 miles by 30, and 432 sq. m. in area, it is the tenth in size and twelfth in population of all the twelve Welsh counties. The beautiful Wye traces all the south-western and southern boundary, the Teifi runs through the western portion. It is hilly or mountainous, in the Forest of Radnor attaining a maximum altitude of 2163 feet. Of half-a-dozen mineral springs, those of Llandrindod are in most repute. The rocks are mainly Lower Silurian, and the soils poor, less than half of the total area being in tillage, whilst woods and plantations cover nearly 8000 acres. The rearing of stock is the principal industry. Radnorshire returns one member; and till 1885 another was returned by the Radnor district of parliamentary boroughs—Cefnllwy, Knighton, Kinmelia, New Radnor, Prestigne, and Rhayader. Pop. (1801) 19,135; (1814) 25,438; (1818) 23,528; (1891) 21,791. See Williams' History of Radnorshire (Tenby, 1838).

Radom, an old but interesting town of Poland, on a sub-tributary of the Vistula, 60 miles S. of Warsaw. It is the seat of an active trade; dyeing and the manufacture of glass are important industries. Pop. 12,402. — The government has an area of 4768 sq. m., and a pop. (1869) of 782,274.

Radovitz, Joseph von, Prussian statesman, born February 5, 1797, at Blankenburg, was the son of a nobleman of Hungarian descent, and in 1813 entered the Westphalian army as an officer. After the peace in 1815 he taught in the military school of Cassel; but in 1823 he entered the Prussian service, and in 1830 became chief of the general staff. A lover of science, he became connected with the Prussian aristocracy, and soon became the leader of the anti-revolutionary party. In 1836 Radovitz was sent as Prussian military commissioner to the German Diet at Frankfort, and held diplomatic posts at Carlsruhe, Darmstadt, and Neuburg. He was the confidential adviser of King Frederick-William IV. in his endeavours to bring about a reform of the German Diet. After the revolution of 1848 the endeavours of Prussia to give a constitution to Germany, by means of the alliance of the three kings, was principally his work. He wrote several works, mainly political, and died 25th December 1853. See Lives by Frensdorff (1850) and Fischer (1874); and Hay-ward's Biog. and Crit. Essays (1st series, 1858).

Rae, John, Arctic traveller, was born in Orkney in 1813, studied medicine at Edinburgh, and went to Hudson Bay as doctor of the Company's ships. In 1845 he undertook an exploring expedition, and in 1846-47 a number of his men were wintering in Repulse Bay. He was second under Richardson in 1848 on a Franklin search voyage. In 1853-54 he commanded an expedition that proved King William's Land to be an island. In his various journeys a nearly 1800 miles were travelled over for the first time. In 1860 he surveyed a telegraph line to America by the Faroes and Iceland, and visited Greenland; and in 1864 he made a telegraph survey from Winnipeg across the Rocky Mountains. He published reports of his expeditions, and a miscellaneous geographical work by Rae, who was LL.D., F.R.S., &c., died 24th July 1893.

Raeburn, Sir Henry, R.A., portrait-painter, was born 4th March 1756, at Stockbridge, then a village near Edinburgh, where his father was a manufacturer and mill-owner. His parents died when he was about six years old; and he was educated in George Heriot's Hospital, and apprenticed to James Gilliland, a goldsmith and jeweller in the Parliament Close. While in this employment his turn for art attracted the attention of David Deuchar, the etcher and seal-engraver, who gave him some instruction; and he afterwards studied under David Martin, producing at first water-colour miniature portraits with such success that he was soon able to devote himself exclusively to portraiture in oils. A careful miniature of Deuchar, still preserved, forms a curious example of Raeburn's earliest style. At the age of twenty-two he married one of his sitters, Ann Edgar, widow of Count Leslie, a lady of means; and, after practising his art for a time in Edinburgh, he resolved to study in Italy. In passing through London he visited Reynolds, who received him kindly, recognising his talent, and furnished him with introductions to Pompeo Batoni and other artists of Rome. After remaining two years in Italy he returned and settled in Edinburgh in 1775, the date of his fine portrait of the second Lord President Dundas. He soon received full employment as a portrait-painter, and before long attained acknowledged celebrity and fortune, and held the picture-dealing in Scotland. In 1812 he was elected president of the Society of Artists in Edinburgh; and in 1814 Associate of the Royal Academy, London; and in the following year full Academician. He was knighted by the Duke of IV. during that march's visit to Scotland in 1822, and was appointed his limner for Scotland a few days before his death in Edinburgh on the 8th of July 1823.

Raeburn's style was, to some extent, founded upon that of Reynolds. Like Sir Joshua, he aimed at
breadth of effect, a result attained by massing to-gether the lights, and keeping them as far as possible distinct from the shadows, and so making each respectively effective; but he attained his aim in a manner and with a feeling that was characteristic and original. He seldom attempted to produce textbook landscapes, but adopted the quality of execution in rigorous and semi-transparent painting, but adopted the opposite mode of painting, in a low tone, with a crisp, definite touch, working his colours with little admixture of any unctuous medium. In his portraits of men, in particular, the heads are most vigorously modelled, and the characteristic expression is seized in a singularly simple, direct, and effective manner; but works like the seated portrait of his wife and the portraits of the two Misses Grant Sutie sufficiently prove these he could portray the grace and dignity of comely womanhood. His reputation, always high in his native country, is becoming more widely spread, and his works are now much sought after. Among his portraits included above are the celebrated Scotsmen of his day, were Sir Walter Scott, Lord Melvilie, Sir David Baird, Henry Mackenzie, Neil Gow, Harry Erskine, Dugald Stewart, Principal Robertson, Lord Jeffrey, and Lord Cockburn. Technically one of his finest and most complete productions is an extensive portrait of Sir William Wardour. Exhibitions of his collected works were held in Edinburgh in 1824 and 1876; and an excellent series of his portraits was included in the Old Masters Exhibition of the Royal Academy in 1877. His art is fully represented in the National Gallery of Scotland, and examples of his brush are preserved in the National Gallery, London, and in the Louvre. Numerous engravings have been executed from his portraits.

See Life by his great-grandson, W. R. Andrew (Lond. 1886); Portraits by Sir Henry Raeburn (photographs, edited by Sir John Brown; Edin., 1870); Sir Henry Raeburn, a Selection from his Portraits (photogravures, edited by W. E. Henley; Edin. 1899).

Raff, Joachim, musical composer, was born at Lachen on Lake Zurich on 27th May 1822. He began life as a schoolmaster, but, encouraged by Mendelssohn, he devoted himself to music. From 1842 to 1845 he was musical director in a girls' seminary, then taught music at Wiesbaden until 1877; and from that year until his death, on 24th June 1882, he was director of the musical conservatory at Frankfort-on-Main. From the time he turned to music down to the end of his life Raff poured forth an incessant stream of musical productions, more than 200 in all. His works include many classical compositions, as symphonies, overtures, concertos for violin, cello, and piano, operas, quartet, a great variety of pieces for piano and violin, and for piano alone. The symphonies Lenore and Im Wald are reputed his best works. He wrote with considerable poetic charm, much fluency, and great technical mastery, but undoubtedly wrote too much: he is often diffuse, and over-elaborates insignificant themes. In Die Wagnerfrage (1892) and numerous papers contributed to the Neue Zeitschrift für Musik he advocated the works and aims of the new German musical school.

Raffles, Sir Thomas Stamford, British administrator, was born, a sea-captain's son, of Port Morant in Jamaica, on 5th July 1781. In 1795 he was appointed to a clerkship in the East India House, and in 1805 assistant-secretary to a new establishment at Penang; eventually he was made principal secretary. In 1808 he made a voyage to Malacca, respecting which place, and the East Indies in general, he collected much valuable information. In 1811 Raffles accompanied the expedition against Java (q.v.) as secretary to the governor-general, Lord Minto, who himself took the chief command. The island was captured, and Raffles appointed lieutenant-governor of it and its dependencies. Much had to be done in the way of conciliating the native princes and chiefs of the British rule. He appointed British residents at the native courts, and framed rules and regulations for their conduct. He ordered a general survey to be made of the whole island, and checked the attempts of the native sultan of Jokjakarta to expel the Europeans from Java. His efforts were, however, chiefly directed to effecting a complete reform in the internal administration. By frequent personal interviews with the natives he sought to become acquainted with their manners and character, and to educate them and civilise them; and by them he was regarded with great esteem and affection. But at length his health gave way, and in 1816 he returned to England, stopping by the way at St Helena, where he had an interview with Napoleon. On his arrival in England he wrote his work Jawa (2 vols. 1817), and received the honour of knighthood. Java having by this time been restored to the Dutch, Sir Stamford Raffles was appointed lieutenant-governor of Bencoolen, a settlement on the coast of Sumatra, where he landed in March 1818. Shortly afterwards, to paralyse or combat the commercial prosperity of the Dutch in the eastern seas, and to repress the piratical propensities of the Malays, he was sent to form a new settlement at Singapore. In 1824 he was again compelled by ill-health to return to England. But the vessel in which he set sail took fire 50 miles out from Sumatra, and the crew and passengers escaped with difficulty in the boats. By this accident Sir Stamford Raffles lost the greatest part of his effects, including a fine collection of natural history, materials for various East Indian grammars and dictionaries, and for a history of Borneo, Celebes, Singapore, &c. After his arrival in England he lived to carry out what had been one of his favourite projects—namely, the formation of the Zoological Society of London, of which he was named president. He died on 5th July 1826. See Memoir by his wife (1830), and the Life by D. C. Boulger (1838).

Rafflesia, a remarkable genus of plants belonging to the small natural order Rafflesiaceae, an order composed entirely of parasitic plants, which consist merely of a flower, and form part of the Rhizantheae (q.v.) of Lindley. The Rafflesiaeae are natives partly of the Indian islands and partly of South America. The plants of the genus Rafflesia have neither stalk nor leaves, but are enormous flowers seated upon the roots of species of Croton, making their appearance at first as a hemispherical swelling
of the bark of the root, and, after the bark has broken, rising up in the form of a head of cabbage, whilst the perianth is covered with imbricated brown bracts, grows for a few days after it has opened. The perianth is thick, fleshy, and 5-partite. The ovule is inferior, and contains many ovules; and the anthers, which are numerous, are seated under the revolute margin of the top of the style column. After the flower has expanded it diffuses a sweet-like smell, in the manner of a honey-flower, and induces them to deposit their eggs. The largest and first-discovered species, R. arnoldi, was discovered in 1818 in Sumatra by Dr. Arnold, and was sent to the eminent botanist, Robert Brown, by Sir Thomas Stamford Raffles (q.v.). Its flower-magnificence has not been equalled, it is infested with containing almost 2 gallons of liquid, sometimes weighing 10 pounds, and is the largest of all known flowers. A smaller species, R. patnae, whose flowers are 16 inches to 2 feet in diameter, is highly prized by the Javanese as a medicine, for its strong styptic powers. R. barfoeldii, another Javanese species, is still smaller, its flowers being only 3 inches broad.

Rafn, Karl Christian, critic and archaeologist, was born at Brakesborg in Fuen, 10th January 1796, and educated at the university of Copenhagen, of which he was appointed sub-librarian in 1821. In 1825 he conducted extensive explorations in Denmark, and founded (1825) the 'Society for Northern Antiquities.' As secretary of this society he edited and published a great many ancient Scandinavian MSS., occupying about seventy volumes. He was named professor in 1826, and died at Copenhagen 29th October 1864. Among his numerous important works we may mention a Danish translation of Norse Mythic and Romantic Sagas (1821–26), and his Antiquitates Americanae (1837), in which he shows that America was discovered by Norsemen in the 10th century (see VINLAND).

Ragatz, a spa of Switzerland, in the south-east corner of the canton of St Gall, by rail 68 miles SE. of Zurich and 13 N. by W. of Chur (Coire); it stands at the mouth of the ravin leading to Pfaffers (q.v.), from which town it gets its healing waters by a stream of 18 miles long. Schelling, the German philosopher, is buried in the parish churchyard. Pop. 1896.

Ragged Schools. The Ragged School, as distinct from the Certified Industrial School, is a voluntary agency providing education for destitute children, and so preventing them from falling into vagrancy and crime. Vagrant children, and those guilty of slight offences, are provided for in the Certified Industrial School; but the two institutions are frequently combined. The movement which established ragged schools was almost simultaneous with that which instituted reformatory schools. John Lambton, a poor shoemaker at Pontefract, has the honour of originating the idea. For twenty years, up to the time of his death in 1839, he gathered the ragged children of the district round him as he sat at work. They came freely, and were taught gratuitously. The success attending his humble efforts soon led many more influential friends of the 'outcasts' to engage in the same work. In 1838 London had a Ragged Sunday School, which eventually became a free day-school. Field Lane followed in 1843. But the first ragged feeding-school was opened in 1841 by Sheriff Watson, in Aberdeen. In 1845 the Rev. Dr. Robertson, not then aware of the existence of Sheriff Watson's, opened a similar school in the Vennel, Edinburgh. Soon afterwards Dr. Guthrie's famous Plan for Ragged Schools appeared, a work which gave an irresistible impetus to the movement, and caused the author to be generally regarded as the father of ragged schools. A ragged school was founded at the Castle Hill in 1847 (since 1857 at Liberton). After this ragged schools sprang up in all parts of the land, until there was scarcely a town of any importance that had not one or more. The Education Acts—England, 1857, and Scotland, 1872—introduced the principle of compulsory attendance at school; under this provision, a large number—especially in England—was of a kind—of 'feeding-schools' find themselves compelled to continue their efforts. In places where the system has been efficiently conducted juvenile crime has sensibly diminished. These ragged schools do not receive government aid. The capitation grant of £2 10s., allowed by a Privy-council minute in 1856, was withdrawn in 1859.

Raghuvansa, a great Sanskrit epic, attributed to Kalidasa (q.v.). The subject is similar to that of the Rama-yana, but begins with an account of Rama's ancestors, 'the family of Ragin,' an ancient king of Anga (modern Madura). The epic was composed after 1821.

Raglan, Lord. Fitzroy James Henry Somerset, eighth son of the fifth Duke of Beaufort, was born September 30, 1788. He entered the army in his sixteenth year, and in 1807 served on the staff of the Duke of Wellington in the expedition to Copenhagen. He went to the Peninsula as aide-de-camp to the duke, and in 1812 became his military secretary. As Lord Fitzroy Somerset his name became a household word. He was present at all the great actions of the Peninsula campaign, being among the first to mount the breach at the storming of Badajoz; and it was to him that the governor of Badajoz offered his sword and a letter to Napoleon from Elba; he served under the duke in Flanders, and lost his sword-arm in the crowning victory of Waterloo; and the very next day he was seen practising writing with his left hand. For his brilliant military services he was made K.C.B., and received orders from several foreign potentates. He was minister-plenipotentiary at Paris in 1815, and secretary to the French embassy from 1810 to 1819. The duke was appointed in 1819 Master of the Ordnance, and Raglan again became his military secretary; and in 1826, when the former became commander-in-chief of the British army, Raglan was called to the Horse Guards as his military secretary. This office he held until the death of his chief in September 1852. He was then made Master-general of the Ordnance, and in October was called to the House of Peers as Baron Raglan of Raglan, in the county of Monmouth (q.v.). He had previously sat in the Lower House during the parliaments of 1818 and 1820 for the borough of Prato. While Master-general of the Ordnance he was sent as Commander-in-chief of the English forces to the Crimea in 1854 (see CRIMEAN WAR). The desperate infantry battle of Inkermann obtained for Raglan the baton of field-marshal; but as the campaign proceeded unfavourable comments began to be made upon his conduct of the war. During the winter of 1854–55 his soldiers suffered unspeakable privations, and hundreds perished in camp and on board transports for want of the food, clothing, and medicines which were in store, but could not be found in the confusion that prevailed—the fault mainly of the home authorities. The siege continued without much apparent success until June 18, when a general assault was ordered, and when Raglan's troops, as well as the French, received a terrible repulse. Raglan had been suffering from a slight attack of
cholera, and the disaster of June 18 weighing upon his mind, he suddenly became worse, and died of exhaustion, June 28, 1835. His remains were brought to England and buried in the family cemetery at Badminton. He proved himself to be a skilful tactician, although it may be doubted whether he had the capacity of a great general. His personal bravery won universal admiration; and his courteous and noble bearing, his gentleness of temper and firmness of mind, and his constant worship of duty, invest his character with something of the chivalrous. See Kinglake, Peace be with Conmen (1863-87); and Hanley, The War in the Crimea (1891).

Ragman Roll (ragman, a word of uncertain origin, used in ancient diplomatic language for an indenture or legal deed), the name given to the collection of instruments which record the acts of fealty and homage performed by the Scottish nobility and by the great of England, during his military progress through Scotland in 1296, and afterwards at the parliament held at Berwick. The original instruments of homage under the seals of the parties were deposited in the Royal Treasury of England, and have almost entirely perished; the rolls of homage in Westminster Palace preservcs a record of them. Its contents were given in an abridged form in Prynne's Records, and afterwards printed in extenso by the Bannatyne Club in 1834. An especial value attaches to the Ragman Roll as containing the largesl evidence of the extraordinary extent of the nobility, barons, landlords, and burgesses, as well as of the clergy of Scotland, prior to the 14th century, and the only genuine statistical notices of Scotland of the period.

Ragouarâck (Ger. Götterdämmerung), the end of the world, when the gods (Odin, Thor, &c.) shall be overcome by their enemies and the world be burned up. See SCANDINAVIAN MYTHOLOGY.

Rags. Fragments of almost all kinds of textile materials have now a commercial value. In the middle of the 19th century all white papers were made of rags, but the great increase in the consumption of printing-papers for daily newspapers and cheap periodicals has for many years necessitated the use of other materials, such as esparto, woodfibres, &c. (see PAPER). Linen and cotton rags alone are still, however, used for bank-note and other fine and strong papers, and are mixed with other materials, such as wood-pulp, for inferior kinds. These rags furnish the manufacturer with a material already half milled into paper, so to speak, because the preliminary processes of boiling out the silica, &c. from straw or esparto are not required in the case of woven linen or cotton. Hence rags of vegetable fibre will always be valuable for paper-making.

Woollen rags have a higher value than linen or cotton kinds, or at least than mixtures of these. Old woollen clothes or shreds of such are called, in the manufacturing districts where they are worked up, Old Mungo (see SNODDY). These rags either are bought up, or "ground up," as it is termed, and re-manufactured into coarse flannels, druggers, comforters, &c. Some are actually ground into a sort of powder for flock wall-papers. The imports of linen and cotton rags into Great Britain in 1863 (before esparto was much in use for paper-making) amounted to 25,267 tons, valued at £300,681. In the same year 14,417 tons of woollen rags, valued at £551,824, were imported. In 1889 the imports were, of cotton and linen rags, 42,443 tons, valued at £426,522, and of woollen rags, 31,305 tons, valued at £660,438 (217,000 tons of esparto fibre were imported in the same year). A comparison of these figures will show the increased quantities now imported, as well as the depreciation in the value of rags. A large quantity, probably amounting to from one-third to one-half of the amount of British imports of linen and cotton rags, is re-exported to the United States; or at least rags to this extent are exported from England thither, but a certain proportion of them may be of British production.

Ragstone, an impure limestone, consisting chiefly of lime and silice, much used in Kent. It breaks up into pieces about the size of a brick, and is hard and flat bedded. The name is also applied to the hard irregular rock which frequently overlies the building marl, and is used for building purposes, bones or sharpening stones for sayetly, &c. are made of it.

Ragusa (Slav. Dubrovnik), a decayed city of Dalmatia, stands on the east shore of the Adriatic, 100 miles S.E. of Spalato and opposite the Gulf of Manfredonia in Italy. It is surrounded with strong walls, and has a very picturesque appearance when viewed from the sea. The city seems to have been colonised by refugees from Epidamnum (now Old Ragusa, a few miles to the south-east), Salona, and other Greek-Roman towns destroyed by the Slav invaders of the Balkan peninsula. For some centuries Ragusa was a Roman outpost on the edge of the Slav states, and flourished greatly under the protection of the Venetian Republic. Towards the end of the 12th century Ragusa was made to acknowledge the supremacy of Venice, though she retained a large share of autonomy. In 1338 Venice ceded her Dalmatian possessions to Hungary, and that time down to the era of the Napoléonian wars Ragusa was generally destined to look to Hungary (i.e. the German empire) for help against her enemies, although from the beginning of the 15th century she was a free and independent republic. It was at the same time that she began to take a prominent place amongst the trading states of the Mediterranean, her prosperity being due to her position between the Christian powers and the empire of the Turks, and the privileges she enjoyed of trading freely with the subjects of the sultan. Her cargoes (i.e. "vaghi") were sent either to the Baltic; and a contingent joined the great Arundan when it set sail for the invasion of England. Ragusa was the home of the middle of the 15th century of a remarkable literary movement, stimulated by the Renaissance (see Servia). During the course of the Napoléonic wars the French entered the city in 1806; this led the Russians to bombard the place. But in 1809 Napoleon declared the republic of Ragusa to be at an end, and in the following year incorporated it in the kingdom of Illyria. Since 1814, like the rest of the Dalmatian seaboard, it has belonged to Austria. Ragusa had, however, long before this declined from her former greatness. Through spared the attacks of foreign foes, she suffered repeatedly from fires, plagues, and earthquakes. The earthquake of 1667 was particularly disastrous. Yet Ragusa still contains several striking and interesting buildings, chief amongst them the palace of the rectors (chief magistrates), built in the Gothic and Classic Renaissance styles between 1433 and 1464; the custom-house and mint, dating from before 1312 and finished in 1520; the Dominican church (1360) and monastic buildings, and several other buildings in the picture by Titian; the Franciscan church and monastery (1517); the church of St. Biagio (Blaise), the patron saint of the town, built in 1348-52, but rebuilt in 1719; and the churches of San Salvatore and Alle Dune. The old cathedral, which tradition says was founded by Richard I. of
RAGUSA

England when on his way home from Palestine, was destroyed by the earthquake of 1667; its modern successor (1671-1713) possesses some valuable silver ornaments and curiosities. There is also a large Jesuits' church (1690-1725). The harbour is small and now sanded up. Merchandise is landed and embarked at the harbour of Gravosa, a short distance to the north. Pop. 7245.

See T. G. Jackson, Dalmatia (vol. ii. 1857), and Pypin and Spanheim, Geschichte der slavischen Literaturen (vol. i. Leip. 1860), where the best books are quoted.

Ragusa, an old town in the south of Sicily, 31 miles WSW. of Syracuse, stands on the right bank of the Ragusa, 14 miles from the sea. In the cliffs below the walls and around the town ancient tombs have been excavated. A neighbouring grotto yields stones impregnated with porphyrion. Ragusa is supposed to occupy the site of the ancient Hybla Herae. It consists of two communies—an upper, with 24,183 inhabitants, and a lower, with 6290.

Ragwort, the common English name of those species of Senecio (q.v.) in which the heads of flowers have a spreading ray, the involucre has small scales at the base, and the leaves are pinnatifid. The British species are large coarse weeds, with erect stems, and yellow flowers; one species, the Common Ragwort (S. Jaco-

Common Ragwort (Senecio Jacobea).

...and another collection. See also her correspondence with Veit (1861) and with Varnhagen (1875); and books on her by Schmidt-Weissenfels (1857), Assing (1877), and Mrs Jennings (1876).

Railway, a manufacturing city of New Jersey, on the Railway River, 4 miles from its mouth, and 20 miles W. of New York. Pop. (1900) 7633.

Rai Bareil, or Rai Bareil, a town of Oudil, India, stands 48 miles SE. of Lucknow, and has a large brick fort (15th century), a magnificent palace and tomb of a former ruler, and some fine mosques. Pop. 11,731.

Ralfseisen, Friedrich Wilhelm (1818-88), born at Hamm, near Coblenz, held various posts in the Prussian government service, but is known as the founder of the agricultural banks on a principle similar to the people's banks of Schultze-Delitzsck (q.v.) now found all over Germany, Austria, Switzerland, and Italy. He wrote several books in exposition of the system. See CO-OPERATION.

Raihes, Robert, originator of Sunday-schools, was born at Gloucester, September 14, 1735. His father was printer and proprietor of the Gloucester Journal, and he succeeded to the business, keeping it till 1802. He loved children all his days, and his pity for the misery and ignorance of many in his native city led him about 1780 to start a school where they might be taught to read and to repeat the Catechism. In the columns of his journal attracted attention, the movement grew, and Raihes himself lived to see his schools widely spread over England. He died 5th April 1811, and was buried in the church of St Mary de Crypt, Gloucester, all the children that attended his funeral being given by his directions a shilling and a plum-cake. See Lives by Gregory (1877), Eastman (1880), and Harris (1899).

Rail (Rallus), a genus of birds of the family Rallidae, having a slender bill rather longer than the head, wings of moderate length, long, powerful legs, and very long, completely-divided toes. The only European species is the Common or Water Rail, or Bilecock (R. aquaticus), found in marshy districts throughout England and in many parts of Scotland and Ireland. Many of the birds migrate southwards on the approach of winter. Like most of its relatives, the water-rail is very shy in its habits, and though it does not readily fly, generally escapes detection by threading its way swiftly and quietly through the reeds when its nest is approached. During the breeding season, however, it frequently utters a loud, harsh, groaning cry.

Water-rail (Rallus aquaticus).

The nest of the rail is made of coarse grass or reeds, usually well hidden among thick aquatic plants. The eggs, numbering seven to eleven, are 'pale creamy-white, sparsely flecked with reddish brown and ash-gray.' Two broods are reared in a season. The food consists of worms, snails, and soft vegetable substances. The adult bird is about
a foot in length; the prevailing colours of the plumage are olive-brown on the upper, ash-gray on the under parts. The tints of the female are duller than those of the male, while the young bird has the under parts creamy-white, barred with brown. Nearly allied to the water-rail are the Moor-hen and the Corn-crake (q.v.). Typical of the American rails is the Virginian Rail (R. virginianus).

**RAILWAYS**

The addition to tractive power through the diminution of friction to be obtained by the use of rails upon a road appears to be so obvious a fact in mechanics that it is not surprising to find records from very early times of the employment of various materials with this object (see TRAMWAYS). Stone or wood was first used, but towards the end of the 18th century the improvements in the production of iron permitted the substitution of that metal on lines laid down in collieries and quarries. The employment of steam-power for locomotion on ordinary roadways was the subject of numerous experiments in various countries during the 18th century, but the credit of producing the first practical working engine is ascribed to Nicolas Joseph Cugnot (1725-1804), a native of Void in Lorraine. His carriage, constructed in 1769 at the French National Arsenal at the cost of the Comte de Saxe, ran on three wheels, and had two single-acting cylinders turning the front wheel. In the United States Oliver Evans (1755-1819) in 1804 constructed a steam dredging-machine which propelled itself on wheels to the river, a distance of 15 mile. The improvements of the steam-engine effected by the inventions of James Watt soon led to better forms of locomotives, and comparatively successful models were produced by William Murdock; by William Symington of Dumfarton, the pioneer of steam navigation; and later by Richard Trevithick, whose steam-carriage was exhibited in London in 1805. The development of the high-pressure engine was largely due to Trevithick’s numerous experiments and inventions. The first railway locomotive was tried, it is said, on the Merthyr tramroad in 1804, but the experiment was not successful, and to the venerable ‘Puffing Billy,’ patented in 1813 by William Henson, and now to be seen in the museum of the Patent Office, must be ascribed the honour of being the progenitor of the enormous stud of iron horses now existing in all quarters of the world. In previous experimental lines rack rails and toothed wheels had been provided under the mistaken notion that the adhesion of a smooth wheel to a smooth rail would not be sufficient. ‘Puffing Billy,’ after many trials and alterations, commenced regular working at the Wylam Colliery, near Newcastle-upon-Tyne, in 1813, and was kept in constant use until 1872, when it was purchased by the government.

A standing difficulty with the earlier forms of engine was the want of adequate and uniform steam-power, various devices being employed to secure the requisite draught to the furnace. The problem was first solved by George Stephenson. In 1815, after many previous experiments made while acting as colliery engineer, it occurred to him that the waste steam might be utilised as a blast to stimulate combustion, and from this idea, with the subsequent invention of the multitubular boiler (by Booth), securing enormously increased heating surface, the present form of locomotive was evolved. Other improvements made by Stephenson comprised the direct communication between the cylinders and the wheels, and joint adhesion of all the wheels by the use of horizontal connecting-rods. An engine constructed by him was the first to run on the Stockton and Darlington line, opened for public traffic on 27th September 1825. The engine weighed about 8 tons, and could make a speed of nearly 16 miles an hour. The Stockton and Darlington line was constructed for mineral traffic; and it was not until the opening of the Liverpool and Manchester Railway that the vast possibilities of the new form of transport were proved beyond cavil. The directors of that company, with a view to settle the method of traction on the line then approaching completion, offered a £500 prize for the best locomotive engine. Stephenson’s ‘Rocket,’ comprising the improvements above mentioned, was the only one that complied with the conditions laid down, and at the competition which took place at Rainhill in October 1829 its superiority was at once manifest. It drew a coach with thirty passengers along the prescribed course at the rate of 30 miles an hour. The ‘Rocket’ went into regular service on the opening of the railway in the following year. It weighed, with its supply of water, only 4½ tons, and long after it had been superseded by heavier engines, on one occasion ran 4 miles in 4½ minutes. All the many changes which have since been effected in the appearance and size of the locomotive have been more matters of detail than of principle. The 75-ton express passenger-engine, which runs at a speed of 6 miles per minute for miles together, does not differ materially in construction from George Stephenson’s pioneer engines.

A modern development, however, of importance...
for economy of fuel is the adaptation to the locomotive of the 'compounding' principle which has effected such a revolution in steam navigation. By this invention (see Steam-engine) the steam after doing duty in one cylinder or pair of cylinders is made available through its expansive power in another and larger cylinder. Engines formed on this plan are used extensively on the London and

North-Western Railway, the North-Eastern, and the Great Eastern. A saving of from 10 to 15 per cent. in fuel is claimed by advocates of compound locomotives, the objection being a complication of parts.

Considerable diversity has hitherto existed in the type of locomotive on various lines; but the policy now adopted by nearly all the leading companies of manufacturing their own rolling-stock, and the obvious advantage of having interchangeable parts, has led of late to the gradual adoption of a more uniform style of construction for the different kinds of service required. As a general rule inside cylinders are in use on the through lines of the United Kingdom, it being contended by many authorities that for high speeds the placing of the weightier parts of the machine close to the centre of gravity minimises oscillation. It is held further that the moving part of the machinery is better protected by being placed within the wheels. On the other hand, the objections to be urged are the increased cost and complication of the driving-axle and the comparative inaccessibility of the valves and pistons for purposes of repair. Outside cylinders have been adopted on the London and South-Western Railway and on other lines, and, supported by the bogie-truck, this form of engine approximates closely to the type in use on American railroads. The bogie-truck consists of a separate frame carried by two or more sets of wheels and attached to the engine or carriage by a central pivot; by this contrivance the wheels adapt themselves more readily to inequalities or to sharp curves. The boiler on English locomotives is invariably carried on a stiff plate frame, while in the comparatively cheaper form in use in the United States the running portion of the machinery is attached directly to the boiler by means of a bar frame, which in Britain is thought to throw undue strain upon the structure.

But that it may, the types of passenger express engines in England and in the United States are undoubtedly approximating more and more closely (see fig. 4). The large single-driving wheel at one time generally used on express locomotives is now more rare, except in the case of some of the new compound engines, but for high speeds it possesses some advantages. For goods-engines the six-coupled wheel, inside cylinder type, is in most general use, while the forms of tank-engines for local and suburban lines and for shunting purposes vary with the different companies and the different services to be performed. Of acces-
series to working perhaps the most important added in recent years is the injector, a contrivance for picking up water in transit from troughs placed between the rails. It is the invention of Mr Ramsbottom of the London and North-Western Railway, and is in use on some lines where long distances are run without stopping.

In the matter of fuel some very successful experiments have been made on the Great Eastern Railway in the use of oil refuse in conjunction with coal, and liquid fuel is now employed on several of the company’s locomotives and stationary engines (see Fuel). The use of liquid fuel by itself in locomotive work is open to course to some objections, such as the starting of the fired and the sudden reduction of temperature when the fuel is shut off, but these do not apply where the two

planted ordinary forms of railway construction may be mentioned the atmospheric railway described at Pneumatic Despatch. Later developments in the form of electrical power (see Electric Railways) promise in the future more formidable rivalry.

The overhead railways of New York are supported on iron columns, and traverse the principal streets, affording accommodation to an enormous number of passengers. Liverpool has also adopted an overhead railway for communication along the line of docks. The project for the carriage of ships and their cargoes by railway was brought to a practical test by the Chignecto Ship Railway (1889–92), across the narrows neck connecting Nova Scotia with the mainland. Lines have also been surveyed across the Central American isthmus. The rack system of railways, which was the earliest form of iron road, has been since adopted with advantage for the working of lines having steep grades. The Mont Cenis (1863) and Rigi Railway (1871) in Switzerland are among the best-known instances of this form of construction. The Zermatt Railway, 22 miles in length, opened in 1891, is the best example of the ‘combined’ working. The engine (metre gauge) has four cylinders, the outer pair of which are connected with wheels running on ordinary rails. The inner pair operate a central toothed wheel which runs on a single rack laid on such portions of the line as are of steep gradient. The two sets of cylinders can be worked separately or together as required.

A similar line has been constructed ascending Pike’s Peak in Colorado to a height of 14,134 feet. The highest points at which the locomotive are Galera, a village in Perí, 15,635 feet, and those touched by a line from Galera rising 215 feet higher. The railway crossing the Andes in South America, from Buenos Ayres to Valparaiso, in to be worked for some 17 miles, and on part of the state railways in Bosnia and Herzegovina it is employed.

The Lartigue system of light railways of which several short lines have been constructed—one in Ireland and others in France—comprises only a single rail. The carriages or receptacles for goods are balanced on either side, pannier fashion, on a pyramidal structure of wood or iron, 3 or 4 feet in height, which carries the rail (fig. 8). A ‘bicycle’ railway has been proposed and an experimental line constructed in the United States, the engine and carriages being retained on the single rail by an overhead support held between small horizontal

wheels. In the French ‘gliding railway’ (1888) a thin film of water is kept between the rails and the sledge which supports the carriage.

Carriages.—The builders of the earliest railways did not intend them for passenger so much as for goods traffic. On the Stockton and Darlington

Fig. 6.—Elevated Railway, Sixth Avenue, New York.

Fig. 7.—Train on the Manitor and Pike’s Peak Railway.

fuels are interchangeable. The consumption and cost of coal alone per mile passenger express train may be taken at 84 lb. of fuel and 3½d. To do the same work 10½ lb. of liquid fuel and 15 lb. of coal are used, say 2½ lb., at a cost of 2½d. Of various contrivances designed to supersede or sup

pleent ordinary forms of railway construction may be mentioned the atmospheric railway descripted at Pneumatic Despatch. Later developments in the form of electrical power (see Electric Railways) promise in the future more formidable rivalry.

The overhead railways of New York are supported on iron columns, and traverse the principal streets, affording accommodation to an enormous number of passengers. Liverpool has also adopted an overhead railway for communication along the line of docks. The project for the carriage of ships and their cargoes by railway was brought to a practical test by the Chignecto Ship Railway (1889–92), across the narrows neck connecting Nova Scotia with the mainland. Lines have also been surveyed across the Central American isthmus. The rack system of railways, which was the earliest form of iron road, has been since adopted with advantage for the working of lines having steep grades. The Mont Cenis (1863) and Rigi Railway (1871) in Switzerland are among the best-known instances of this form of construction. The Zermatt Railway, 22 miles in length, opened in 1891, is the best example of the ‘combined’ working. The engine (metre gauge) has four cylinders, the outer pair of which are connected with wheels running on ordinary rails. The inner pair operate a central toothed wheel which runs on a single rack laid on such portions of the line as are of steep gradient. The two sets of cylinders can be worked separately or together as required.

A similar line has been constructed ascending Pike’s Peak in Colorado to a height of 14,134 feet. The highest points at which the locomotive are Galera, a village in Perí, 15,635 feet, and those touched by a line from Galera rising 215 feet higher. The railway crossing the Andes in South America, from Buenos Ayres to Valparaiso, in to be worked for some 17 miles, and on part of the state railways in Bosnia and Herzegovina it is employed.

The Lartigue system of light railways of which several short lines have been constructed—one in Ireland and others in France—comprises only a single rail. The carriages or receptacles for goods are balanced on either side, pannier fashion, on a pyramidal structure of wood or iron, 3 or 4 feet in height, which carries the rail (fig. 8). A ‘bicycle’ railway has been proposed and an experimental line constructed in the United States, the engine and carriages being retained on the single rail by an overhead support held between small horizontal

wheels. In the French ‘gliding railway’ (1888) a thin film of water is kept between the rails and the sledge which supports the carriage.

Carriages.—The builders of the earliest railways did not intend them for passenger so much as for goods traffic. On the Stockton and Darlington

fuels are interchangeable. The consumption and cost of coal alone per mile passenger express train may be taken at 84 lb. of fuel and 3½d. To do the same work 10½ lb. of liquid fuel and 15 lb. of coal are used, say 2½ lb., at a cost of 2½d. Of various contrivances designed to supersede or sup
line. Ordinary coaches placed on suitable wheels were used for the early passenger business, which was encouraged, and until comparatively recent years the coach was the model for railway-carriage builders. Third-class passengers were accommodated in open wagons, with or without seats. So late as 1845 many of these vehicles had no windows, and were variously painted and fitted by venetian blinds. On several of the lines no lamps were supplied in third-class carriages even for the night journeys. The first-class passengers booked their tickets as in coaching days, and their luggage was packed on the roof of the carriage in which they were allocated. As the passenger traffic increased the public became more exacting in its demands, and gradually more attention was given to the comfort of passengers, and the tendency of modern management is to add to the luxuriousness of the carriages, especially in long-distance trains. On account of the gradual decrease of second-class passengers, many of the principal companies abolished that class; but, owing to the companies who still retain it lowering the rates nearly to the level of third-class, the numbers have considerably increased again in 1886-97. Composite carriages for first- and third-class passengers are usually supplied in long-distance journeys and every comfort for both classes. Drawing-room, luncheon, and dining cars are also provided for day expresses; and sleeping-cars for night trains are fitted with all the luxury of a first-class hotel. There were in 1887 of locomotives in England 16,600, in Scotland 7,877—total 19,479; of carriages: England 51,284, Scotland 7,163, Ireland 295—total, 61,411; of wagons: England 493,428, Scotland 136,017, Ireland 18,030—total, 647,475.

The cost of the passenger express locomotive may be put at from £2500 to £3000; the more powerful engines, if made by locomotive builders, would cost from £4000 to £5000, but, like most of the carriages and wagons, they are usually built by the companies themselves. A goods-engine such as that illustrated in Fig. 5 costs about £250 and a tank-engine (without tender) £1500 to £2000. The cost of a Pullman carriage is from £2000 to £3000; of an ordinary first-class carriage, £350 to £700; second, £430 to £900; third, £380 to £450; of a coal wagon carrying eight tons, £60 to £70; of a goods wagon carrying ten tons, £72 to £80;

**Brakes.**—The supply of brake-power has been the subject of many ingenious patents, and is dealt with in a separate article in this work. The use of continuous brakes of some approved form on all passenger-trains in the United Kingdom was made compulsory by the Railway Regulations Act of 1889. See the article **Brakes**.

**Railway Construction.**—The cost of constructing railways is dependent on many conditions, such as cost of labour, the nature of the district traversed, and value of the land required. In England the last-named item has been a very serious one, and heavy parliamentary expenses have also added largely to the cost per mile, which, including equipment, averages £44,710 for the United Kingdom. The most expensive railway system in the world is the London, Midland, and Scottish lines, including the 'Tun- Circle' line of London. A circular railway of this description was recommended by a parliamentary committee in 1894. The scheme has been carried out by two companies, the Metropolitan and the Metropolitan District, which have since extended their respective systems into the suburbs. This circle, including the purchase of land, which was the heaviest item, has cost from £600,000 to nearly £1,000,000 per mile. The Metropolitan line from Bishop's Road to Farrington Street was opened on 10th January 1863, but the circle, owing to financial and other difficulties, was not completed until October 1884. Another very costly section of railway is that of the South-Eastern between Charing Cross and Cannon Street, London, which includes two large stations with hotels and two bridges over the Thames in its length of two miles. The cost of this short piece of line has been over £1,000,000 per mile. In other countries the land acquired has been of much less value, and in many cases has been given by the government. Moreover, the traffic has not been so heavy, and consequently lighter works have sufficed than those which the Board of Trade require in Great Britain. The average cost of railways in the United States are thus under £12,000 per mile, and in Western Australia the railways have been built and equipped at about £4000 per mile. In flat tracts, such as the prairies, where the traffic is light, the rails can be laid with but little prepared roadway; but this is an exceptionally favourable condition, engineers in most cases having to span rivers (see **BRIDGES**), pierce hills or mountains (see **TUNNELS**), cut through elevations, and carry the line over low-lying ground on embankments. In an ordinary clay soil the cost of cutting and embankment may be taken at from 1s. to 1s. 3d. per yard, with about 2d. extra for trimming slopes, &c. In the case of chalk, hard rock, or sand the cost would naturally be much higher; and the length of cartage is also another important item. The cost of ballasting the rails is usually, up to the bed of gravel, burned clay, or other suitable material is laid, and in this are imbedded the 'sleepers,' to which the rails are fixed. A good navvy will dig and throw out into a barrow in a day of ten hours in common ground from 8 to 10 cubic yards, or 5 to 7 cubic yards in areas of ground surrounded by rails. The 'steam navvy' is now largely employed in railway work, and does in one day the work of from seventy to eighty men (see **EXCAVATOR**).

In laying out a line it is of great importance that heavy gradients and sharp curves should be avoided, as the former add to the cost of working and the latter interfere with speed. Some of the sharpest railway curves in the United Kingdom are on the Harrow gauge Paddington line, where there are curves as sharp as the sweep of Oxford Circus—of but 116 feet radius—for short lengths. This line runs to a point 700 feet above Portmadoc in less than 12 miles, giving an average gradient of one in 82, and a maximum gradient of one in 80. On the Sleaford and Bourne gauge line in Lincolnshire, where radius of the line, on the other hand, is practically level, the gradients averaging about one in 400. The advantage of an easy gradient will be seen from the following calculation: If an engine and tender, weighing together 56 tons, is capable of drawing a maximum load of, say, 40 loaded wagons, weighing 560 tons, at 25 miles per hour on the level, it will
RAILWAYS

only take the following loads over the gradients named below, and the speed would also be considerably reduced.

<table>
<thead>
<tr>
<th>Load</th>
<th>40 wagons weighing 500 tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incline</td>
<td>1 in 100</td>
</tr>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>1 in 50</td>
</tr>
<tr>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2 in 50</td>
</tr>
<tr>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

Before the Board of Trade will sanction the opening of a line it has to be satisfied as to the strength of the bridges, that a minimum distance of 6 feet has been left between the lines, and as to other conditions.

The form of 'permanent way' has altered considerably since the laying of the first railways. The wooden rails on the Stockton and Darlington weighed 28 lb. to the yard. The cheapening of steel which followed the invention of the Bessemer process has led to the use of that material for rails throughout the world, and the size of the rails has been successively increased until between 80 and 85 lb. per yard is the usual weight. In British railway practice the rails are supported on cast-iron chairs held by wooden wedges, and the chairs are spiked on to transverse wooden sleepers. On American and colonial lines chairs are dispensed with, and the rails are spiked directly on to the sleepers. The points are made with 'fish-plates' bolted on each side of the rails, and the bolt-holes are made oblong or elliptical to permit of the expansion and contraction of road under changing temperatures. Blocks of stone were sometimes used in the early history of railways to support the metals, but the rigidity obtained was found to be very destructive of rolling-stock, and wooden sleepers lying on gravel ballast are now almost universally employed. Iron sleepers have been found serviceable in some countries where wood is liable to the attacks of insects.

In 1830, in order to bind the agricultural and other interests in districts too poor to make or support a railway on the usual terms, the Light Railway Act was passed in 1836 to empower the construction of lines of cheaper construction and simpler working than the ordinary. To avoid the heavy parliamentary expenses, the bill gives power to a Light Railway Commission to make inquiry, and if it is satisfied, to issue orders (subject to the approval of the Board of Trade) for the construction of such railway. County, Burgh, and District Councils are also empowered to initiate such a railway, or otherwise to give the necessary capital, and the Treasury may also advance a line sum at 3½ per cent. not exceeding one-fourth of the whole capital. Several acts have been passed for the construction of light railways in Ireland as a means of relieving distress. Under the act of 1890 government voted £130,000 for this purpose.

Signals.—At a very early stage of railway working a system of signals was found to be necessary. In 1830, when the Liverpool and Manchester line was opened, a flag by day and lamp by night were adopted. A semaphore at the gateway, and in 1837 the managers of the Grand Junction Railway erected poles about 12 feet in height, with discs and lamps turned through a quarter circle by the pointsman working a lever at the base. About 1842 a semaphore signal, somewhat resembling the present form, was introduced by the Manchester, Liverpool, and Bury line. Up to 1846 there were no 'distant' signals, but in that year this extra precaution was adopted. The successful concentration and interlocking of the levers working both points and signals was effected in 1846 near Loggiators' Arns Junction, and in 1856 the first interlocking points were fixed at Willesden Junction. Since that date the interlocking and concentration of signal and point levers has made rapid progress, and of the total signals and points in the United Kingdom over 91 per cent. are thus protected. The signals now in use may be divided into two classes, as 'home' and 'distant.' The signals to 'home' are called 'advanced starting,' and 'distant,' the last named used on goods sidings. By the interlocking of points and signals, if the signalman has for instance moved a lever that opens a pair of points to enable a train to come out of a siding on to the main line, the 'home' and 'distant' signals must be at 'danger' to stop any train from approaching on the main line, and it is impossible for him to lower them.

In the working of a railway the telegraph plays a very important part. By its means trains are opened up, and the Stockton and Darlington signals are superseeded. The signalman has for instance moved a lever that opens a pair of points to enable a train to come out of a siding on to the main line, and it is impossible for him to lower them.

In 1833, however, the absolute block telegraph system was introduced. Under the absolute block telegraph system there may be more than one train in each section. Taking A and B as the stations at each end of the section, the working of the absolute block system is thus arranged: the signalman at station A gives to station B what is called the 'Be Ready' signal, which indicates the nature of the approaching train. The man at station B, if the previous train has passed his cabin, and he knows that the section between A and B is clear, repeats this signal to the next box. The train is then despatched from A, and when it approaches B, giving the warning 'Train on Line,' which the man at B acknowledges, and at once gives the 'Be Ready' signal to C, and so on. As soon as the train has passed B, the man in that box telegraphs 'Line clear' to A, who acknowledges the message. Of the double lines in the United Kingdom over 94 per cent. are worked on the absolute block system. On most single lines the 'train-staff and ticket' system is adopted. In this case, suppose there are three trains at the terminus of a line or section to proceed to the other end, the first and second trains are divided, while the third is given the only key for the box in which the tickets are placed. No train is allowed to enter the opposite end of a section until the train staff arrives, so that it is impossible for two trains to meet. The proper distance between trains running in the same direction is maintained by fixed signals, and the block telegraph is the same as on double lines. If necessary, the line is divided into sections with crossing places, each section being worked as a separate line. By the 'train-tablet' system, a circular metal disc is electrically controlled from the box, and is a combination practically a 'train-staff' and block-telegraph system combined. Mechanical details of signalling have on occasions to be superseded by manual work. In case of fog a man, generally one of the platelayers, is stationed at the foot of each distant signal to give the warning 'distant,' and to 'danger' places on the rails two detonating signals, which are exploded by the engine as it passes over them. If the engine-driver hears no explosion he knows the line is clear.
ordinary vehicles of the country. On all the lines built by George Stephenson, and most of the other leading engineers in the United Kingdom, this 4 feet 8½ inches gauge was adopted; but in 1838 Brunel, in his desire to secure Knight the attention speed and capacity of the then constructed rail- ways, determined upon a 7-feet gauge for the Great Western Railway. This brought about the now historic battle of the broad and narrow gauges. The Eastern and the Great Western (the Great Eastern), opened for traffic in 1843, had a 5 feet 6 inches gauge, the Caledonian 5 feet 6 inches, and in Ireland there were 5 feet 2 inches and 6-feet gauges. So long as lines of different gauges serving separate districts did not come into contact the inconvenience of breaks of gauge were not felt, but when the broad and narrow gauges met at Gloucester in 1845, and at other points later on, the evil effects were soon felt. Goods and passengers had to be transferred from the one set of carriages to the other, and no through services were possible until at a later period the Great Western laid a third rail to accommodate the narrow-gauge trains. So serious became the difficulties which arose through the breaks of gauge that in 1845 a commission was appointed; it reported in favour of the narrow gauge, and in August 1846 an act was passed ensuring that every passenger coming into the United Kingdom should be able to construct any railway for the conveyance of passengers on any gauge other than 4 feet 8½ inches for Great Britain and 5 feet 3 inches for Ireland. It was, however, provided that railways constructed before the passing of the act on any other gauge should be allowed to maintain their independence. The Great Western, therefore, continued to maintain its broad gauge, and as late as 1867 there were 1450 miles of line on this system, having junctions at twenty-six points with the narrow gauge. In due course, however, the Great Western realised the disadvantages of their isolation; the narrow gauge has been gradually adopted on the system, and the date fixed for the final disappearance of the broad gauge was the 20th May 1892. Parliamentary sanction has, however, been given to various exceptionally narrow gauge lines. In most European countries the gauge adopted has been about the same as the British standard, with the exception of Spain and Russia, where the gauge is somewhat wider.

Accidents.—The number of persons killed on the railways of the United Kingdom in 1890 was 1076, and injured 4721. Of those killed 118, and of the injured 1261, were passengers; but of the fatal accidents only 18, and of the injuries 496 were due to causes beyond the control of the passengers—viz. accidents to trains—the others arising from various causes, especially want of caution on the part of individuals themselves. Taking the number of passenger journeys, exclusive of those of season-ticket holders, at 817,744,046, the proportion of passengers returned as killed by accidents beyond their own control was 0.00135, and of injured one in 1,468,677. In the case of rail- way servants 12 were killed and 147 injured by train accidents, and 487 killed and 2975 injured by other accidents. The number of persons employed on the railways of the United Kingdom is estimated at 1,46,429, of whom 1,433 were killed and one in 111 injured by train and other accidents. These are very high proportions, but it is only fair to the managers to say that every precaution is taken to secure the safety of employees. Too often, however, voluntary combinations and mechanical appliances for their protection neglected by the men themselves. The proportion of deaths and injuries has moreover steadily declined of late years. It has been suggested that many accidents were due to men working overtime, railway companies have now to make periodical returns as to the hours of labour on their systems.

Speed.—Mr Worsdell, the locomotive engineer of the North-Eastern Railway, with a powerful 860 horse-power engine and a 3.75-feet gauge, attained on one occasion a speed of 86 miles an hour. On the Philadelphia and Reading Railroad in the United States in August 1891 a distance of about 3 miles was run at a rate of 90 miles an hour. Mr Stroudley, engineer of the Brighton line, said that a light engine could easily attain 100 miles an hour. The actual running time of trains is of course considerably below such limits. The fastest speed in ordinary service and the largest proportion of high-speed trains are to be found on the railways of Great Britain—the careful finish of the road, the fencing of the track, and the comparative absence of level crossings giving an undoubted advantage in this respect over all foreign systems. The best regular running-time as yet made on railways was in the ‘race to the North,’ between the East and West Coast routes, commenced in 1888. The London and North-Western in May of that year announced their intention of reducing their time between Euston and Edinburgh from 10 to 9 hours. The East Coast companies accepted the challenge, reducing their time from 9 to 8 hours. It was found that both routes was reduced to 8 hours. The distances to be covered were by the East Coast 393 miles, and by the West Coast 400; the gradients on the former being more favourable. The ‘race to the north’ was resumed between the rival railways in 1895, when on 22nd August the west route did the journey from London to Aberdeen, 540 miles, in 8 hours 40 minutes, an average of 63.3 miles per hour, including stops. The expense and risk of these high-pressure speeds led to the resignation of Mr Stroudley, who had been chief engineer of the Great Western and Great Northern railways. The fastest train now performs the journey from London (King’s Cross) to Edinburgh in 7 hours 45 minutes, to Perth in 9 hours 25 minutes, and to Aberdeen in 11 hours 20 minutes, including stops. On the New York Central in 1891 a special run was made from New York to Buffalo, a distance of 457 miles, in 440 minutes, including three stops aggregating 15 minutes. The following may be taken as the best express services now regularly running in different parts of the world in miles per hour, including and excluding stops respectively:

<table>
<thead>
<tr>
<th>Country</th>
<th>Service</th>
<th>Miles per hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>England—London to Leeds, G.N.R.</td>
<td>43.4</td>
<td>51</td>
</tr>
<tr>
<td>United States—New York to Philadelphia, N.Y.R.</td>
<td>47.5</td>
<td>49.8</td>
</tr>
<tr>
<td>France—Paris to Calais, M.R.R.</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td>Germany—Berlin to Hamburg, R.B.R.</td>
<td>37.3</td>
<td>49.5</td>
</tr>
</tbody>
</table>

The average rate for express trains may be taken as under, all trains running above 40 miles an hour being taken as 'express' in Great Britain and the United States, and all above 29 miles an hour on the Continent:

<table>
<thead>
<tr>
<th>Country</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain</td>
<td>with stops 41/2 without stops 41/2</td>
</tr>
<tr>
<td>France</td>
<td>38</td>
</tr>
<tr>
<td>Holland</td>
<td>36</td>
</tr>
<tr>
<td>Germany</td>
<td>34</td>
</tr>
<tr>
<td>Belgium</td>
<td>33</td>
</tr>
<tr>
<td>Austria</td>
<td>32</td>
</tr>
<tr>
<td>Denmark</td>
<td>30</td>
</tr>
<tr>
<td>Norway</td>
<td>31</td>
</tr>
<tr>
<td>Italy</td>
<td>32</td>
</tr>
<tr>
<td>Sweden</td>
<td>31</td>
</tr>
<tr>
<td>Russia</td>
<td>36</td>
</tr>
<tr>
<td>United States</td>
<td>41</td>
</tr>
</tbody>
</table>

On the Canadian Pacific line a special train to convey the Japanese mail in 1891 performed the distance from Vancouver to Brockville, opposite the New York frontier, in 77 hours, at a speed of 30 miles an hour for the whole 2800 miles. On the Grand Trunk line the best service is 36.8 miles including stops, and 38.2 excluding stops. The best service in India is from Bombay to Calcutta, about 25 miles an hour. The distance from Mel-
bourne to Sydney is run at 33 miles an hour including stops, and 37 miles excluding stops.

Fares and Rates.—The standard English passenger fare was 7s. 6d. for a 100 mile first class, 1s. 6d. per mile second class, and 7d. per mile third class. The experience over a series of years has shown a constant increase in the volume of third-class travel, which in 1890 formed 75% of the whole passenger business in the United Kingdom. A Midland Company decided on the abolition of the second class, and in 1890 the Manchester, Sheffield, and Lincolnshire Company and the Caledonian Company partly adopted the same policy. The Midland Company, however, by running Pullman drawing-room and sleeping cars at an extra fare, practically re-established the three classes. In the United States the average fare may be taken at 1s. 6d. per mile, extra charge being made for drawing-room and sleeping cars.

The following official statistics as to the comparative fares per kilometre in the different countries of Europe were published by the French government:

<table>
<thead>
<tr>
<th>First Class</th>
<th>Second Class</th>
<th>Third Class</th>
<th>Free Ragazza</th>
</tr>
</thead>
<tbody>
<tr>
<td>England...</td>
<td>12¢ centimes</td>
<td>6¢ centimes</td>
<td>6¢ centimes</td>
</tr>
<tr>
<td>France...</td>
<td>12¢ centimes</td>
<td>6¢ centimes</td>
<td>3¢ centimes</td>
</tr>
<tr>
<td>Germany...</td>
<td>12¢ centimes</td>
<td>6¢ centimes</td>
<td>3¢ centimes</td>
</tr>
<tr>
<td>Italy...</td>
<td>12¢ centimes</td>
<td>6¢ centimes</td>
<td>none</td>
</tr>
<tr>
<td>Belgium...</td>
<td>9¢ centimes</td>
<td>7¢ centimes</td>
<td>none</td>
</tr>
</tbody>
</table>

With regard to goods, the charges on British railways are higher on the whole, but the speed of the goods-trains and the character of the service is superior.

With long hauls in some countries of course lower charges may be charged. The grain rates in America have been reduced to about 3¢ per ton per mile, and on Indian railways, with cheap labour and fuel, a standard of 4¢ per ton per mile has been reached.

The Midland Company, authorising the construction of the Stockton and Darlington Railway, the first used for passenger traffic, received the Royal assent on 19th April 1821. The first rail was laid on 23rd May 1822, and on 27th September 1825 the railway was opened with great ceremony. Four hundred and fifty passengers were conveyed in the first train. The train arrived at Darlington, a distance of 82 miles, in 65 minutes. When fifty years later the jubilee of the railway system was celebrated there were 10,449 miles of railway working in the United Kingdom, representing a capital cost of £300,993,000, and producing from traffic a revenue of £56,898,000, of which £24,893,000 was received from passenger fares and £32,005,000 from the conveyance of goods and minerals.

At the close of 1897 there were 21,433 miles of railway open for traffic. The authorised capital for the construction of railways was £1,089,763,095, of which English railways had £396,411,043, Scottish railways £133,857,595, and Irish railways £39,406,457. The total receipts of these railways were £233,757,054, of which £79,739,776 were to England, £105,138,357 in Scotland, and £33,531,291 in Ireland. Of the total capital stock of the railways in the United Kingdom, £103,061,275 is guaranteed, £27,321,045 debentures, £209,743,440 preferential, £425,501,582 ordinary stocks and shares, and £12,507,733 loans. The gross revenue of all the railways is derived from—passengers, £40,518,064; goods, £47,557,172; mails and parcels conveyed by passenger trains, £6,482,164; and miscellaneous items. The number of passengers carried was 1,093,420,251, of whom 935,129,879 were third-class. The total working expenditure was £30,993,950, and the profit on the gross receipts; the net receipts were £40,953,250, giving a percentage of 30% in the total capital. Of the working expenditure, £13,712,718 was for locomotive power; £4,371,121 for repairs and replacements of carriages, etc.; £8,018,880 for maintenance of permanent way, etc.; £1,185,569 for interest on money borrowed; £4,871,668 for payment to the railway companies paid £116,329 as compensation for personal injuries sustained in 1897, and £315,088 as compensation for damage and loss to goods traffic.

The railway system of the United Kingdom has not been developed according to any plan previously marked out, nor does it owe any of the changes which it now holds to support or assistance given to it by the state. It is the outcome of private enterprise carried on in very many instances under great difficulties, in spite of much national and local prejudice, and at an expenditure of capital greatly in excess of what could have been repaid under more favourable conditions. In 1830 the Duke of Wellington, then at the head of the government, was asked to appoint some engineers to lay out four or more main lines which would form the great highways for the locomotive. The duke’s reply was that he did not like railways; and Mr Goulburn, the Chancellor of the Exchequer, decided to take no action in the matter, on the ground that interference with vested interests would create an amount of opposition which the government could not withstand. Private enterprise was then supplied the railway development which the national government refused to give. The Liverpool and Manchester Railway was opened for traffic in 1830, and in 1838 there was a completed line between London and Birmingham. During the interval of the opening of these two lines—now absorbed in the London and North Western system—fifty-six acts of parliament were passed authorising the construction of 1890 miles at a total estimated cost of 45 millions.

The Railway Mania.—A later period marked with greatly increased activity of the private promoters. Parliament had required as a condition precedent of considering any new railway bills that a deposit of ten per cent. of the estimated cost should be lodged with the accountant-general by the promoters, and paid over in cash in the first five years. On the 30th of November in 1845, the latest date at which the Board of Trade would receive plans of new railways, there had been lodged 12,863 bills, with plans and sections for new railways, representing a capital of 250 millions, and required a deposit of 25 millions. The amount required for payment of the deposit exceeded by more than 20 millions the whole amount of gold and coin in the Bank of England and notes in circulation. The publication of these figures created alarm, and a panic ensued, the stocks of existing railways were greatly depreciated, and the premiums on the shares of the newly-promoted companies, which had been created by a wild spirit of speculation, disappeared, and widespread ruin and commercial disaster ensued. The result was that, of the 12,863 companies which were promoted, 1214 only survived the ordeal of parliament.

Railway Administration.—Up to 1891 there had been passed over 4000 separate acts of parliament authorising the construction of new or dealing with the railways, of which the cost may be estimated at £300,000,000. In order to compensate to some extent for the lack of original design and system in connection with the railways, the companies have resorted to numerous plans for amalgamation, fusion, purchase, or working agreements between themselves. There are at present 516 railway companies in the United Kingdom. Of the railways owned by these companies 200 are worked or leased by other companies. The
Great Western, for instance, has thirty-six railways of which it is the lessee, and has joint-ownership of four others. The movement of the traffic over the separate systems of railways is provided for under the Clearing-house Association (see Clearing-house); and in 1888 an act was passed giving to the Board of Trade authority to call for returns, and deal with the schedule of rates and charges for conveyance of passengers and goods.

The earliest railways were authorised on the supposition that they would, like canals, be highways for the use of carriers. A scale of maximum tolls was prescribed in each act, and the canal classification of goods adopted. Later on the railway companies prepared a new classification. Each railway act also contained a clause authorising the railway company to charge a reasonable sum in addition to the maximum tolls, in order to cover carriers' services, risks, and profit; and from about the year 1845 each railway act prescribed a scale of maximum charges for conveying goods. To these maximum rates most of the companies were allowed to add a terminal charge for the services of loading, unloading, covering, collection, and delivery, &c. Although the companies had thus power to charge certain rates, the maximums were seldom exceeded. The charges thus developed were not such as the traders were dissatisfied, and demanded frequent inquiries into the working of railways. Three such inquiries were held between 1858 and 1884, but the companies were on the whole acquitted of the charges preferred against them. As the result of the inquiry of 1872 the Railway Commission was appointed to specially deal with disputes between traders and the railways. In 1883 the government made an attempt to deal with the whole subject of railway rates, but it was not until 1888 that any considerable part of the inquiry was passed. The whole of 1889 and the whole of 1890 were occupied with inquiries before the Board of Trade and a joint committee of both Houses of Parliament, as to the rates and classifications of the railways, and the result has been acts which came into force on 1st August 1892, amending the charges and classifications of nine of the leading lines.

**Zone System.**—In 1889 a new departure was inaugurated on the Hungarian state railways by the introduction of the Zone system for passengers, under which each station, taken as a point of departure, is considered as the centre of one of a series of zones, which increase in a regular ratio, and in which the fares are arranged on a simple plan. This was followed by the introduction on the Austrian railway system of the Kreuzer tariff, which is a combination of the Zone and Kilometer systems; and in 1891 the Zone system was also applied in Hungary to the goods traffic.

**Results of Railway Working.**—At the time when the Liverpool and Manchester Railway was completed, ten miles an hour travelled by the fastest stage and mail coaches was about the limit of speed attainable. At that time the population of the United Kingdom was about 25 millions; in 1891 it was nearly 38 millions. At the opening of the London and Birmingham Railway there were 3928 stage-coaches, 54 four-horse and 49 pair-horse mail coaches, each being licensed to carry fifteen passengers, would represent 16,500,000 individual journeys in the course of the year, and it may be safely assumed that not more than 10 millions of such journeys were made. The number of coaches on the railways was officially stated at 82 millions of letters. In 1890 the number of passengers carried on the railways was 817 millions. On the basis of work done by stage-coaches in 1837, we should require over a quarter of a million of these vehicles to move the passengers now conveyed over the 20,000 miles of railway. On 30th November 1830 the first of Her Majesty's mails from Liverpool was conveyed by the mail-coach to the railway. The increased facilities thus afforded converted a uniform penny post from a theory into a reality when that system came into operation on 5th December 1839. In 1890 the Post-office celebrated the jubilee of the penny postage, and in that year carried nearly 306 millions of letters, and 1,400 millions of post-cards, 413,000 millions of newspapers, 199,000 millions of letters. To have conveyed this would have required more than thirty times the number of coaches which carried the mails half a century since. The news in those days was carried at an average speed of 81 miles per hour. The railways carry the mails at an average speed of over 40 miles per hour.

The total traffic in coal on the railways of the United Kingdom amounted to over 126 millions of tons in 1890. Of the total meat supply of London the railway companies convey about 64 per cent.; whilst of milk four companies alone import about 22 millions of gallons each year. The supply of vegetables, fruits, and flowers for London and other large towns is also mainly dependent on the railways. The fish trade of the country also depends largely on the railways. The statistics of recent years—in 1890, 383,000 tons of this valuable item of food supplies were conveyed by rail from the ports to inland markets.

**State Ownership of Railways.**—It may be assumed in general that railway construction has been less harnessed by state interference in the British Islands and in the United States and Canada than in any other parts of the world, and it is precisely in these countries that railways have attained their highest development. In other parts of Europe the railways, as a rule, are either the property of governments or companies which owe their existence to the initiative and encouragement of governments. Buildings of railways in France was undertaken in a much more methodical manner than in Great Britain. The country is partitioned out among six great companies, and competition has thus been entirely avoided. The government owns a third of the capital invested, and will ultimately about the middle of the 20th century become the absolute proprietor of the various systems. The state has the right to fix fares and charges, and to determine the amount of new mileage to be constructed from time to time. So far as technical skill is concerned, the railways of the country are well managed, but the accommodation provided is far inferior to that in Great Britain or the United States; passenger-trains are comparatively few and crowded, and the freight service is very slow. The main lines are very remunerative in their operations, but the local roads are mostly worked at a loss. In Germany the roads are owned and managed by the government, and political and military considerations are paramount in the working of the system. The lines have been cheaply constructed, the cost being less than half per mile that in Great Britain. The tendency in most other European countries is towards state ownership or control of railways. The Russian government since 1880 has been actively engaged in buying up private railways and leasing new ones, and at the present time some 40 per cent. of the system is owned by the state. In Belgium the whole of the lines have been so purchased by the government. In Austria only one line is a state railway.
American continent by undue legislative restrictions. State ownership has never been seriously discussed; land has been cheap or free for occupation; the distances to be traversed are great, and it is small wonder, therefore, that the iron road has become a mixed blessing, an ordinary highway. Before the date of the celebrated locomotive trial which evolved the 'Rocket,' an engine was run in America called the 'Stourbridge Lion,' a machine made in England, and imported by the Delaware and Hudson Canal Railroad Company. The first railroad in the United States was, however, begun in 1828 by the Baltimore and Ohio Company, a section of 15 miles from Baltimore to Ellicott's Mills being opened in May 1830. Horse- traction was first used on this line. American engines are now found competing with English-built machines in many parts of the world, including the British-Australian colonies.

It is, however, in the matter of carriage construction that the American railroad engineer has marked out an independent path and obtained the most striking results. For many years European railways had been fitted with the old stage-coach. The longer distances travelled on the American continent, and the republican spirit which objected to the division of classes, led to the adoption across the Atlantic of the long railroad car, with a central passage between the seats. The growing cost of horsepower and some increased attention to such details as springs, couplings, and brakes, and in the provision of such accessories for comfort and safety American railroad practice has long been in advance of that in any other part of the world. Republican simplicity of status, the demand for improved accommodation, gave rise to drawing-room, sleeping, and dining-room cars, and the stock turned out for these purposes by the Pullman and Wagner companies challenges comparison with the provision made for the travel of royalty in the Old World. The 'Vestibule' trains running on most of the trunk-lines for long distances—say between New York and Chicago—represent the highest ideal yet obtained of luxurious travelling. Railway stock of this character is mostly owned by independent companies, whose officials collect the extra money accommodation.

In the United States, nearly one-half the total mileage was constructed between 1880 (93,526 miles) and 1892 (184,428 miles), while previous to 1850 the greater portion of the railroads made were in the states bordering on the Atlantic, and were for the most part isolated lines employed for local traffic. A great development to this form of enterprise was given by the discovery of gold in California, and lines were rapidly pushed towards the centre of the continent. The great civil war at the commencement of the next decade emphasised the necessity of connecting the interior with the improved accommodation to cement the Union, and government assistance was freely given both in lands and money to the two companies, the Union Pacific and Central Pacific, which, building respectively from the east and the west, met near Salt Lake City in May 1869, the total length from the Missouri River to San Francisco being 1700 miles. Since that date five transcontinental lines have been completed, including the Canadian Pacific Railway on British territory. The rate of general railroad construction has varied considerably, but the total length was between 1880 and 1890. In 1882 11,500 miles were built, and in 1887 no less than 12,878. A large extent of this mileage was built in advance of the necessities of the districts traversed, and in other cases existing lines were paralleled, to the heavy loss of the interests concerned. These periods of over-construction and resulting competition, combined with a necessary reduction of mileage rates as the centre of agricultural production moved westward across the continent, caused at times much depression in railroad securities. The system of finance under which the companies borrow money on mortgages with floating interests (not of British railway debentures) has also caused heavy loss to investors in American railways, many of which have been reorganised, with the accompanying 'assessment' or 'wiping out' of junior securities. The average mileage constructed 1887-97 was 3,533.

To meet the effects of over-construction a system of 'pooling' receipts was adopted by the various trunk-lines. Under this plan the receipts from any given description of traffic were made into a common purse, and divided among the companies concerned in an agreed ratio. The state railroad commissions were powerless to deal with traffic originating or passing out of their respective territories; but in 1888 the Interstate Commerce Commission was appointed with federal authority to deal with questions affecting traffic. Under the new rules, the half miles of mileage, the long and short haul clause, establishing uniform mileage rates, was, contrary to the result, expected to produce disastrous results to railway revenues. The outstanding railway capital in the United States is stated to have been necessary for 568—by 64% of the company's outstanding capital, which was more than half, or $3,504,424,255 consisted of capital stock, while the funded debt amounted to $5,276,385,519. The cost per mile of completed road was $50,020. The gross earnings were $1,122,088,773, equal to 10:35 per cent. on the investment, and the net earnings $830,953, 2:47 per cent. on the outstanding capital; other sources of income amounted to $125,009,010, and the total income was $494,635,019. The interest on indebtedness was 4:99 per cent., and the average dividends on stocks 1:22 per cent. Passengers to the number of 504,106,525 were carried, with an average distance of 24:73 miles, while 788,385,448 tons of freight were carried an average distance of 124:15 miles. The average receipts per passenger mile were 2:03 cents, and per ton of goods per mile 0:80 cents, the latter a lower average than in most other countries, the distances hauled being unusually great.

Colonial and Foreign Railways.—Canadian railways follow closely in their characteristics the construction and methods of working of the lines across the boundary. The return of 1880 gives a total of about 14,000 miles completed, of which the greater proportion of the mileage being divided between two companies, the Grand Trunk and the Canadian Pacific. The nominal capital, including advances made and aid granted by the Dominion government, was $780,447,000, or $561,174 per mile. The earnings were returned at $458,444,000, and the net profits at $13,330,000. Passengers were carried to the number of 12,821,000, and 20,787,000 tons of freight.

In Mexico for many years the line from Vera Cruz to the capital, constructed in 1859 at a heavy cost by British capital, was the only railway in existence; but routes connecting with the systems of the United States were subsequently constructed under American auspices. Of railways in other Central American states the Panama line constructed by American capital, as the first link in the isthmian canal, was the first impor-

The interchange of the Atlantic and Pacific are under construction, and a great scheme, traversing the Isthmus from north to south, was discussed and steps taken for the necessary surveys at a meeting of representatives of the various republics held in 1890 at Washington. The project
vies in magnitude with the Trans-Siberian railway scheme in the Old World. The Argentine Confederation represents the chief railway development in the southern half of the continent.

In the early days of railway enterprise in India, the agencies of private companies guaranteed by the state were exclusively used. In 1867, all the great trunk-lines of the country were made under this system. The government gave the land for the lines free of charge, and guaranteed interest generally at five per cent, on the share capital and a dividend of five per cent. In ninety-nine years. Any surplus earnings after the guaranteed rates were paid were divided equally between the government and the companies. Moreover, the government retained the right of buying the undertakings at specified dates on payment of the value of the stock calculated at its market price on the average of the three preceding years. In this way the East Indian Railway was acquired in 1880, the Eastern Bengal in 1884, the Sind, Punjab, and Delhi in 1885–86, the Oudh and Rohilkund at the end of 1888, and the South Indian in 1890. In 1870 a new state of railway development began. The direct agency of the state was inaugurated; and in 1880–81 the system of encouraging private enterprise by state assistance was again adopted. Both agencies are now employed. In some instances— notably the Bengal and North-Western lines—these were constructed with the object of direct pecuniary assistance; in others a subsidy or limited guarantee has been granted. The agency of private companies has also been employed by the government both in the construction and working of state lines. In all cases the government has the power of over-riding the railways at specified periods on stated terms. In 1884 a select committee reported in favour of a more rapid extension of railways than had been taking place, and recommended the broad gauge— i.e. 5 feet 6 inches—except in tracts where the 3 ft 6 inches gauge was already in successful operation, and for local lines where the traffic could only be light. The first railway opened in India was that of the Great Indian Peninsula Company from Bombay to Tannah, traffic being commenced on 4th May 1853, and the close of 1865, 16,996 miles in working. Of this total 6077 miles were state lines worked by companies, 4680 miles state lines worked by the state, 2388 miles were worked by guaranteed companies, 381 by assisted companies, 520 miles were owned by native states and 124 private lines were owned by native states and worked by state railway agency, 547 were owned and worked by native states, and 582 miles were in Portuguese and French territory.

The first railway in Australasia was projected in 1850 in New South Wales, but was completed by the government. With a few small exceptions the railways of the Australasian colonies are owned and worked by the governments. The dates of opening of the first lines and latest mileage returns of each colony are: Victoria, 31st December 1835; New South Wales (29th May 1835), 2182 miles; Queensland (31st July 1865), 2113 miles; South Australia (10th April 1856), 1810 miles; Western Australia (21st January 1864), 569 miles; New Zealand (1st December 1855), 1965 miles; Tasmania (10th April 1872), 364 miles. In Australia, in 1870 there were but 948 miles of railway, but in 1890 there were about 12,000 miles. The distribution of this total is shown above. It is unfortunate that in Australia different gauges have been adopted, so that the systems join in inconvenient and expensive goods and passenger traffic.

The Victorian lines are built on the 5 feet 3 inches gauge, which is also the national standard in South Australia, but this colony has also 700 miles on the 3 feet 6 inches gauge. In New South Wales a 4 feet 8½ inches gauge is the standard, but there is also a 5 feet 3 inches line. In Queensland, Western Australia, Tasmania, and New Zealand all the railways are on a 3 feet 6 inches gauge. The capital cost per mile of the Australasian lines has been: Victoria, £13,612; New South Wales, £12,532; Tasmanian, £8436; New Zealand, £7582; Queensland, £6766; South Australia, £6444; and Western Australia, £4374 per mile. In Cape Colony the first railway was opened on 6th June 1860 and when the government took over the railways in 1873 there were only 63½ miles; in 1890 there were 1890 miles. In China the first short railway at Woosung was torn up after a few months' working, but the line to the Kaping coaleries was not disturbed. Some 100 miles of the Ten-tsin line has since been constructed, and plans are under discussion for the construction of a trunk route. See the articles on the several countries.

Railway Mileage.—The dates of the opening of the first railways, and the mileage in 1801, of the principal countries are as under:

<table>
<thead>
<tr>
<th>Country</th>
<th>Date of Opening</th>
<th>Mileage 1801</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria-Hungary</td>
<td>20th September 1828</td>
<td>16,467</td>
</tr>
<tr>
<td>Belgium</td>
<td>25th May 1835</td>
<td>2514</td>
</tr>
<tr>
<td>Denmark</td>
<td>18th September 1844</td>
<td>1223</td>
</tr>
<tr>
<td>France</td>
<td>1st October 1828</td>
<td>22,586</td>
</tr>
<tr>
<td>Germany</td>
<td>7th November 1838</td>
<td>1363</td>
</tr>
<tr>
<td>Great Britain and Ireland</td>
<td>25th September 1825</td>
<td>20,073</td>
</tr>
<tr>
<td>Greece</td>
<td>15th February 1839</td>
<td>104</td>
</tr>
<tr>
<td>Italy</td>
<td>31st October 1830</td>
<td>931</td>
</tr>
<tr>
<td>Netherlands</td>
<td>18th September 1830</td>
<td>1887</td>
</tr>
<tr>
<td>Norway</td>
<td>14th July 1835</td>
<td>979</td>
</tr>
<tr>
<td>Portugal</td>
<td>9th July 1854</td>
<td>1260</td>
</tr>
<tr>
<td>Russia</td>
<td>4th April 1833</td>
<td>19,027</td>
</tr>
<tr>
<td>Spain</td>
<td>9th October 1845</td>
<td>50,127</td>
</tr>
<tr>
<td>Sweden</td>
<td>14th February 1851</td>
<td>1825</td>
</tr>
<tr>
<td>Switzerland</td>
<td>15th June 1844</td>
<td>1029</td>
</tr>
<tr>
<td>Turkey</td>
<td>4th May 1856</td>
<td>1320</td>
</tr>
<tr>
<td>Egypt</td>
<td>26th January 1856</td>
<td>1494</td>
</tr>
<tr>
<td>Ireland</td>
<td>18th April 1853</td>
<td>16,968</td>
</tr>
<tr>
<td>United States</td>
<td>17th April 1828</td>
<td>167,000</td>
</tr>
<tr>
<td>Canada</td>
<td>19th March 1847</td>
<td>14,000</td>
</tr>
<tr>
<td>Mexico</td>
<td>8th October 1859</td>
<td>10,927</td>
</tr>
<tr>
<td>Argentina Republic</td>
<td>14th December 1864</td>
<td>5798</td>
</tr>
<tr>
<td>Brazil</td>
<td>30th April 1854</td>
<td>5779</td>
</tr>
<tr>
<td>Chili</td>
<td>1 January 1832</td>
<td>1928</td>
</tr>
<tr>
<td>Colombia</td>
<td>January 1840</td>
<td>220</td>
</tr>
<tr>
<td>Paraguay</td>
<td>1st October 1849</td>
<td>149</td>
</tr>
<tr>
<td>Peru</td>
<td>25th May 1853</td>
<td>924</td>
</tr>
<tr>
<td>Uruguay</td>
<td>1st January 1859</td>
<td>587</td>
</tr>
<tr>
<td>Venezuela</td>
<td>9th February 1860</td>
<td>411</td>
</tr>
</tbody>
</table>

See France, History of the English Language (1851); W. Galt, Railway Reform (1853); Smiles, Lives of George Stephenson and Robert Stephenson (1879); Railway Engineering (1871); Arthur Helps, Life of T. Brassey (1872); Francis Trevithick, Life of Trevithick (1872); Adams, Railway and Wagonway Questions (1878); Redman, Law of Railway Companies as Carriers (1889); Burdett's Official Intelligence (1891); Barry and Bramwell, Railways and Locomotives (1881); Bigg, Railway Acts, 1830–66 (1887); and Supplement to, 1875–83 (1883); Minor, Railway Travel in Europe and America (1863); Jeanf, Private Bill Legislation (2 vols. 1885–87); Ivatt's Railway Management of Stations (1885); Waring, State Purchase of Railways (1887); Professor Marshall on State Ownership of Trunk Railways and Lines (1889); Jeane, Railway Problems of Working in Different Countries (1887); M'Dermott, Life of Firbank (1887), and The Railway Clearing-house (1887); Williams, Our Iron Roads (1888); and The Midland Railway (1883) (1888). L. Grierson, Railway Rates, English and Foreign (1886); Findlay, Working and Management of an English Railway (1889); Aecworth, Railways of England and Foreign (1889); and B. H. Beale, History of the Law of Railways, by Lely (7th ed. 1889); Hyde, The Royal Mail (3rd ed. 1889); Foxwell and Farrer, Express Trains, English and Foreign (1889); Fisher, Railway Accounts and Railway Finance (1891); and Board of Trade Railway Returns (of capital, revenue, accidents, miles, and signals); Foot's Manual of the Railways of the United States (annual); Reports of Interstate Commission of the United States; and for foreign works on railways, see the Catalogue of M. Dunod, Paris.
Raimondi. See Marcantonio.

Rain. Whatever lowers the temperature of the air below the point of saturation, or the dew-point, leaves the air as a rain. Various causes may conspire to bring about this change of temperature, but by far the most important of these originate in winds and other movements of the atmosphere. The more prominent principles of the connection of the winds to the rainfall are these: the rapid ascent of the air, but also to great extent of ocean before reaching land the rainfall is large; (2) when the winds, on arriving at the land, advance into higher latitudes or into colder regions the rainfall is largely increased, for the simple reason that the air is now more rapidly brought below the point of saturation; (3) if the winds, even though they have traversed a great extent of ocean, yet on arriving at the land at once advance into lower latitudes or into warmer regions, the rainfall is small; (5) if a range of mountains lie across the onward course of the winds, the rainfall is largely increased on the side facing the mountains, but reduced on the other side of the range: the reason being that, as the air on the windward side of the ridge is suddenly raised to a greater height in crossing the ridge, the temperature is still more reduced by further ascent, and a more copious precipitation is produced. On the lee side, as the air descends to lower levels, it gradually gets drier, and hence the rainfall of necessity diminishes with every stage of the descent to lower levels.

Attention may be here drawn to the diminished vertical extent of land over land and over the sea, as has been fully shown by the observations of the Challenger expedition. From these it has been proved that an envelope of stiller air, or air of less velocity as compared with that of the ocean, broods over the land, and by its presence forces the wind blowing across the land to a greater height, thus augmenting the rainfall. This dragging effect of the land on the wind, and the important consequences resulting from it, explain how it is that during north-easterly storms of rain the shores of the Firth of Forth, Moray Firth, and the east coast of the island, which look like islands, receive a much heavier rainfall than other parts of Scotland in those circumstances. On the Ayrshire coast the annual rainfall at Ayr is 38 inches, but at Girvan it rises to 51 inches. Both stations are close to the coast, the only difference being that the hills to the eastward approach much nearer the coast at Girvan.

For short periods the heaviest rainfall occurs with thunderstorms, and with tornadoes, water-spouts, and other forms of the whirlwind, for the reason that not only is their rapid ascent due to the presence of the winds, but also to the great rarefaction produced by the extreme velocity of the gyration of the air round the axis of the whirlwind. One of the heaviest rainfalls yet recorded in the British Islands was 2-24 inches in 40 minutes at Lednarthe, Forfarshire, during a severe thunderstorm on 8 August 1887. At Camberwell, 3-12 inches fell in 2 hours 17 minutes on 1st August 1846. Of heavy falls during one day the following may be mentioned: Den Nevis Observatory, 7-29 inches, 30 October 1890; Seathwaite, 6-78 inches, 30 August 1854; Tornoe Island, 6-6 inches, 7th September 1870; Newbigging, Wales, 5-33 inches, 14th July 1875; and Cambrinus, Argyllshire, 5-60 inches, 24th January 1868.

In the United States, where severe thunderstorms and tornadoes occur more frequently than elsewhere, the daily rainfalls repeatedly exceed these amounts. Thus, the rainfall of 24th July 1884 at Mount Darby, Texas, was 12-94 inches in 24 hours; 10-70 inches, June 1887; Key West, 7-80 inches, September 1889; Charlotte, 7-61 inches, March 1889; Shreveport, 7-4 inches, January 1885; and a day’s rainfall of from 5 to 7 inches is generally recorded in the United States. These amounts are greatly exceeded in lower latitudes. Thus, on the Kluco Hills, India, 30 inches on each of five successive days have been recorded; at Bombay, 24 inches in one night; and at Gibraltar, 33 inches in 26 hours.

As regards the ocean little is yet known from observation. This, however, is clear, that in the equatorial belt of calms between the regions swept by the two trades the rainfall of the ocean reaches the maximum; and the parts of the Atlantic and Pacific which are longest within the belt of calms as it shifts northward and southward with season have the heaviest ocean rainfall. But, though the cloud-screen is unquestionably dense and the rainfall frequent and heavy, the observations of the Challenger and the Novara show that the statements made as for the climate are exaggerated. Over the open sea in the regions of the trades the rainfall is everywhere small, owing to the circumstance that these winds are an immediate outfall from anti-cycloonic regions, their dryness being further increased since their course is directed in regions that become constantly warmer.

The trades, however, deposit a larger rainfall over islands and other land-surfaces which they traverse; the amounts being proportional to the height of the land, but more particularly to the degree in which the high land ranges lie across the paths of the winds. Thus, at Ascension, which is within the south-east trades the whole year round, the annual rainfall is 8-85 inches; and at St Helena on the coast 5-36 inches, but on the high land in the interior of the island it rises to 24 inches. In the western division of the Pacific, for some distance on each side of the equator, the rainfall is very slight, and extensive guano deposits are formed on Malden and other islands scattered over that region. In Maritius, on the western shore of the island, the annual rainfall is about 2,000 inches; but on the north-east, it is 146 inches, the latter place being in the neighbourhood of extensive forest-land mountains.

The heaviest rainfalls of the globe are brought by the winds which have traversed the greatest extent of ocean within the tropics. These conditions are most completely fulfilled from June to September by the winds which, beginning their course from about 30° S. lat., blow home on southern Asia as the south-west monsoon, which accordingly distributes a heavier rainfall over a larger portion of the earth’s surface than occurs anywhere else in any season. On these summer winds the rainfall of India chiefly depends, and the ‘lie’ of the mountain-systems with respect to the winds intensifies the effects. The following in inches are the annual amounts at different points in the island of Surat southward: Surat, 41; Bombay, 74; Mulk, Lahore, 80; Honawar, 139; Calicut and Cochin, 115. In the west of Ceylon the rainfall is also large, being at Colombo 88, at Galle 90, at Ratnapura, inland among the hills, 150; but in the east of the island, before it reaches the sea, it is reduced to much of its moisture; it is considerably less, being at Mannar 91, at Jaffain 49, and at Trincomalee 62. The rainfall is also very large in Burma, being at Akyab 194, Sandoway 214, Diamond Island 119,
RAIN

Rangoon 99, Tavoy 197, Mergui 162, and Port Blair 117. In the north-east angle of the Bay of Bengal, and thence north to Bluntan, where the summer monsoon curves to a westerly course up the valley of the Ganges, the rainfall is great, rising at Cherra-punjii, in the Khosi Hills district, to 472 inches—or nearly 40 feet—being the largest known rainfall anywhere on the globe. Owing to this diversion in the course of the monsoon, the valley of the Ganges enjoys a generous rainfall. One of the most remarkable falls on record is small over the plains of the Punjab, at Multan 6'79, and at Kurachee 7'25, increasing over the higher parts of the province, at Lahore 21, Umballa 36, Sinoa 70, and Dharmasala 122.

The key to the distribution of the rainfall over the East Indian Archipelago and Australia is the distribution of pressure from south-eastern Asia to Australia, with the resulting prevailing winds. During the winter months pressure diminishes rapidly from Asia southwards, and northerly winds prevail. Now, as these winds have travelled in the great breadth of ocean, they arrive in a highly saturated state and deposit a heavy rainfall over these islands and the north of Australia. The degree to which these rains penetrate into Aus-

tralia depends entirely on the strength of the winds, and also on the position of the anticyclone forming the summer months pressure increases from Asia southwards, and southerly winds set in from Australia to Asia, distributing in their course a very large rainfall over the islands of the Eastern Archi-

pelago, rising at every island in the month. The small rainfall in such islands as Timor, which are more immediately sheltered, as it were, by Australia during these southerly winds, impresses on the region well-marked dry and wet annual seasons. These marked differences are due to the fact that these islands of the East Indian Archipelago really depend on the geographical distribution of land and sea in this part of the globe, and must there-

fore be regarded as permanent differences, and as having played no inconspicuous part in the unique distribution of animal and vegetable life which is so characteristic of the East Indian Archipelago. The summer of the southern hemisphere the winds blow from the sea inland, and in the winter from the land seaward, it follows that generally the summer is the rainiest season. In the interior, along the Murray River and the Murray River, the rainfall is very small. As in Oregon in the interior of the United States.

As regards the rainfall of the two extreme

months, January and July, the following show in inches the amounts for various places: Vera Cruz, 5'10 and 35'0; Pera, 0'65 and 3'26; Manaoas, 7'33 and 1'82; Buenos Ayres, 2'37 and 1'70; Corrientes, 5'24 and 2'97; and in Africa, Alexandria, 1'43 and 0'20; Algiers, 4'43 and 0'04; Senegal, 0'28 and 3'00; Sierra Leone, 0'69 and 24'20; Cape town, 0'28 and 3'83; Durban, 5'00 and 1'70; and Zanzi-

bar, 2'92 and 2'33. The explanation of these and similar differences in terms of the changes of the wind. The South African colonies present the

strongest aspects of climate, so far as the rain-

fall is concerned, being divided into two totally distinct classes, the climates of the Natal coast and of the inland regions where the rains occur during the summer months, and the climates of the other regions where the rains fall chiefly during the winter months. The driest region of Africa is doubtless the Sahara, and the wettest the region from the Victoria Nyanza northwards, including the gathering-grounds of the Nile.

See METEOROLOGY. Also BLOOM, RAIN, and, for showers of frogs and fishes, SHOWERS. For maps of annual rainfall of the globe, see Lewin in Silliman's Amer. Jour. Sci., Murray in Jour. Roy. Scot. Geo. Soc., and Huxley in Climatological Atlas. For particular coun-

tries, Synms, and Buchanan for the British Islands; Raulin for France and Algiers; Blanshard and Elliot for India; the Dutch for East India Islands; Tod, Russell, Hector Ellery, and the British Embassy for China; the Service for the United States; Carinael for Dominion of Canada; the Meteorological Services of the different European countries, &c.

Rainbow. The rainbow is the best known of all optical meteorological phenomena, consisting of a coloured arch formed opposite the sun on falling raindrops, and visible whenever the necessary conditions of a passing shower on one side and a clear and not too high sun on the west of Norway it is 72 inches at Bergen, 46 inches at the Lofoden Isles, and 10 inches at the North Cape; over large portions of Sweden it is 21 inches, and in Russia and Siberia it varies from 20 to 2 inches. Spain presents great advances in the rainfall. In the north-west to 13 inches at Saragossa. In the plains of France and Germany it varies from 20 to 35 inches, rising, however, on approaching the Alps to more than 100 inches. In western Europe the rains are greater generally the rain falls in winter, but in the interior of the United States, and the summer climates of the extreme south of Europe and in the north of Africa, situated at comparatively low levels, are practically rainless, owing to the northerly winds that set in with considerable force at this time of the year towards the heated plains of the Sahara.

The summer winds in the south-east of the United States are southerly and, as they have previously traversed a considerable extent of ocean, they arrive well but not super-saturated, and pour down a monthly rainfall of 6 inches or more from Louisiana to Chesapeake Bay. The comparative equableness of the rainfall over the eastern states is the result of no mountain-ridges lying athwart their path and of the winds passing into higher latitudes and therefore cooler regions. Again, the summer rainfall in the United States and Canada is either nothing or very small; whereas on the east side winds are southerly, and the rainfall consequently equals, or even exceeds, that of the finest agricultural region on the Continent of Great Britain.

Rain, or wet weather, is often regarded as the finest of all blessings, and even by the ancient Greeks, as they have been by many since their time, as a keynote in the domestic life of the household. To the ancient poetical mind it had the same charm and beauty as the rainbow. The ancient Greeks attributed to them the power of giving rain, and the rainbow was regarded as the token of the gift; and therefore it is not strange that when the ancients expressed the wish that the god of rain would send rain, they said, 'May the rainbow appear.'
RAINBOW

other occur. Two bows are frequently seen, each exhibiting the full spectrum of colours from red to violet; but in the inner or primary bow the red is the outer edge and violet the inner, while in the outer or secondary bow the order is reversed, the red being inside and the violet on the exterior. The colours are always arranged in a definite order, that of the solar spectrum—viz. red, orange, yellow, green, blue, indigo, and violet, but shade imperceptibly into each other. The cause of this breaking up of the sunlight into its constituent colours is explained in most physical and meteorological text-books (see Light, by Professor Tait, chap. x., or Meteorology, by E. Loomis, par. 410), but may be briefly summarised as follows:

For the primary bow (fig. 1), let PQR represent the section of a raindrop, and SP a ray of light falling on it. The ray enters the drop at P, meets the surface again at R, is reflected to Q, where it leaves the drop in the direction EQ. The ray is refracted or bent on entering the drop at P and again on emerging at Q—the amount of this refraction depending on the acuteness of the angle at which the ray meets the surface. Now it may be shown that there is a particular point P, such that any ray from S striking the surface below P emerges again above Q, and any ray above P also emerges above Q—the former owing to the more acute angle of the reflection, and the latter to the greater refraction on entering and leaving the drop. The course of two such rays is shown by the dotted lines in fig. 1. Q is thus a turning-point in the emerging rays, and near it a very large number of rays pass out, and an observer at E sees a bright image of S in the direction EQ. This statement applies to any one colour of sunlight; but, as the refrangibility increases from red to violet, the latter is bent more at P and Q, and the line EQ lies at a flatter angle. The observer, therefore, sees the violet rays reflected on drops at a less altitude than those that reflect the red, the other colours being intermediate. The raindrop being spherical, this reflection takes place in all directions, the fixed condition being the radius of the bow, that is the angle between the line from the observer to the bow and that passing from the sun to the observer, or, in other words, the observer's shadow. For red light this angle is 42° 59', and for violet 40° 13'. If the sun were a luminous point each colour would be sharply defined, but at the disc of the sun subtends an angle of about 30°; each colour is broadened to this amount, and they overlap.

Exactly similar reasoning explains the secondary bow (fig. 2). The light that forms it has been twice reflected, at R and at R', the point Q lies above P, and rays entering either above or below P all emerge below Q. A glance at the diagram will show that the greater bending of the more refrangible rays makes the line EQ more nearly vertical, and therefore the violet rays form the outer edge and the red the inner of the secondary bow. The radius of the red is 50° 5', and of the violet 54° 0'. The space between the bows gets no reflected light, but that inside the primary and outside the secondary is faintly illuminated by rays such as are indicated by the dotted lines in fig. 2 and their equivalents in fig. 2, which are not shown. These rays 'interfere' (see INTERFERENCE) with each other, and cause alternations of colour which appear as spurious bows inside the primary and outside the secondary. They can only be seen with strong sunlight and small drops of rain.

The radius of the primary bow being roughly 40°, it is evident that it cannot be seen when the sun is at a greater elevation than this, as the highest part of the bow would lie below the horizon. Hence in the latitude of Edinburgh rainbows cannot be seen for several hours both before noon and after the middle of the afternoon, the sun's altitude being then only sufficient for the formation of the primary bow, and the rainbows, all dependent on the fact that they can only be seen with strong sunlight and small drops of rain. Intersecting rainbows have frequently been seen.

When the sun is reflected from a surface of still water a bow is formed by the reflected image as well as by the sun itself. Lunar rainbows often occur, but the feebleness of the moon's light usually prevents any colours being observed. There are many popular weather-prognostications connected with rainbows, all dependent on the fact that they imply local passing showers. 'A rainbow in the morning is the shepherd's warning; a rainbow at night is the shepherd's delight,' is easily understood when we remember that the rainbow is formed opposite the sun, and that weather-changes in the British Islands generally pass from west to east.

Rainey's Corpuscles. See GREGARINA.

Rain-gauge. Rain-gauges measure the quantity of rain which falls, and are of various constructions. One of the best is that known as Symons' rain-gauge, consisting of a funnel-shaped receiving vessel, and a glass measure of much smaller diameter so as to allow as nice graduation as may be desired. In the fig. a is the funnel-shaped receiving vessel (shown in section in the fig.), 5 inches in diameter, with an upright, sharp-edged and strong rim, in order that it may retain its circularity; b, the vessel which receives the rain collected; and c, the graduated glass measure which measures the amount in tenths and hundredths of an inch. If desired it may be graduated to still greater nicety. Another excellent gauge is one which is a modification of Glaislier's gauge, brought into use by the Meteorological Office. The diameter of this gauge is 8 inches, and there is added to it a vertical cylinder on the top of the
RAJMAHAL

RAIJER

receiving funnel, to retain the snow as it falls and prevent its being blown out of the gauge, as is likely to happen when the funnel is shallow. Beckley's is perhaps the best continuously recording rain-gauge, and is now very generally superseding Oster's so long in use.

Since different amounts are collected at different heights above the ground it is indispensable, if uniformity and comparability is to be attained, that the rims of rain-gauge be cut at one uniform height above the ground. The height now generally adopted is 12 inches. The points it is necessary to secure at the height adopted are:

1. The prevention of in-splashing, which occurs when the funnel is very shallow; and
2. The protection of the gauge as much as possible from strong winds, which so seriously interfere with the amount collected, by placing it near the ground as can be done consistent with the prevention of in-splashing. These conditions are best fulfilled by using the gauges named, and placing their rims 12 inches above the ground. It has been proved from carefully conducted experiments that rain-gauges with diameters varying from 3 inches upwards collect amounts, when in positions exactly similar, within about 3 per cent. of each other. Accordingly, gauges with diameters exceeding 8 inches insure no greater accuracy than smaller ones, being only really required in the case of continuously recording gauges to hold the self-regulating apparatus.

On the other hand, gauges of from 3 to 5 inches diameter, such as Fleming's and Jagga's, give good trustworthy results.

Special care should be taken that the gauge and its glass measure be kept clean; that it be firmly fixed and the rim kept in a horizontal position and that it be made of a material which will stand exposure to the weather well. It should be placed in a situation as open as can be secured for it, particularly towards the directions from which the rain chiefly comes; and in each case it should be as distant from any neighbouring house, tree, or other object at least as far as the height of the object itself.

Rainier, Mount, or Tacoma, one of the highest peaks of the Cascade Range (q. v.), was in eruption during part of 1804.

Rainy Lake, forming a portion of the boundary line between Ontario and the United States, lies west, and 100 miles distant from the nearest point, of Lake Superior, and is about 50 miles long. It discharges by Rainy River into Lake of the Woods. There were gold finds on the Canadian side in 1896-97.

Raipur, a town in the Central Provinces of India, standing on a plateau (950 feet), 180 miles E. of Nagpur, has numerous tanks and groves, an old fort (1640), and a trade in grain, lac, cotton, &c. Pop. 23,759.

RAISED BEACHES. See BEACHES (RAISED), UPHEAVAL.

Raisins are dried grapes, used for cooking, for dessert, and in the manufacture of wines. They are produced in largest quantities in the southeastern provinces of Spain—Malaga, Alicante, and Valencia—and in Asia Minor—the islands of Cos and Samos—and the adjacent districts on the mainland; smaller quantities are grown in Southern Italy, the islands of the Greek Archipelago, and Crete. Currants (q. v.) are a small and peculiar variety produced in Greece, in the Morea, and the Ionian Islands. The grapes intended for raisins are dried either on the vines, after the stalks of the bunches have been partly cut through, or spread out on the ground; it is only in case of continued bad weather or persistent want of sunshine that they are dried by artificial heat. The better qualities are left on the stalks and dried in bunches; these are exported for use as a dessert. All less estimable qualities are intended for cooking purposes, and, to a less extent, for the preparation of artificial wines or the improvement of wines of inferior quality. Raisins are rich in sugar, and it is this property that makes them serviceable to the manufacturers of wines. They are used for table use and sometimes dipped in water upon the surface of which swins a layer of olive-oil, or in a strong potash lye. The object is to make the skin soft and give it a glossy lustre. The raisins grown in Spain are large and bine, and are known in the market as 'Malaga raisins' and as 'lexias,' the former for dessert, the latter for cooking. The raisins of Asia Minor are shipped principally at Smyrna (q. v.), and embrace the Eleme and similar varieties, which are long and light brown in colour, and sultanas, small light-brown grapes, with a thin and downy skin, and no seeds or kernels. British imports in all annually from 493,600 cwt. (1886) to 633,100 cwt. (1887), valued at £813,900 (1886) to £1,022,400. From Spain Britain imports every year raisins to the average value (ten years ending 1889) of £506,370, and from Asia Minor to the value of £399,300 (1889). Of late years raisins have been successfully dried in California; but in 1890 the United States still imported raisins to the amount of 36,914,380 lbs., of the value of $1,997,103.

Rajah, or more correctly RAJ (from the Sanskrit rajan, 'king,' cognate with the Lat. reg-, reger), originally a title which belonged to princes of Hindu race who, either as independent sovereigns, or as feudatories of the reigning monarch, governed districts in India. Now, however, the title has a much wider extension; it is used of independent sovereigns of subject or protected princes, of petty chiefs, of great landowners, and of some persons of eminence who are neither rulers nor landowners.

Rajamahendri, formerly often spelt Rajak-mandry, a town of India, in the presidency of Madras, stands on the left bank of the Godavari, 30 miles from its mouth. It has a museum, a provincial school, two gaols, and some Christian churches. From 1753 to 1758 it was held by the French. Pop. 24,565.

Rajmahal, a decayed town of India, stands on a steep eminence on the right bank of the Ganges, 170 miles N.W. of Calcutta, on the chief town of the Bengal and Bahar provinces, but is now deserted and ruined, being only noteworthy for the remains of its palaces, formerly belonging to Shah Shuja and Kusum Ali, and as a station in an important trade-route. It is mentioned in the records of the lands of Bengal as having been lessened in consequence of the Ganges often shifting its bed at this point. In the beginning of the 19th century it had 25,000 inhabitants, and now only about 4000.
RAJON

Rajon, Paul Adolphe, an etcher, was born at Dijon in 1842, and trained in Paris, partly at the School of Fine Arts. About 1865 he turned to etching, and gained immediate success with his first plate, 'Rembrandt at Work,' after Meissonier. Standing in the front rank of French etchers, he won several medals at the Salon exhibitions, and produced numerous beautiful etched portraits and plates for books. In 1872 he visited England, and published in London in 1873 a portrait of J. S. Mill after Watts, as well as in subsequent years many other plates. His greatest achievements were 'The English Poets,' a picture by Alma Tadema, the portrait of Durand-Ruel, and that of Tennyson, Jonchim, and Mrs Anderson Rose by Watts. He died at Auvers-sur-Oise on 8th June 1888. See Twelve Etchings by P. A. Rajon, with Memoir by F. G. Stephens (1889).

Rajputana, an administrative territory of India, embracing twenty native states and the British district. (2711 sq. m.; pop. 460,722) of Ajmer-Morwar. It lies between Sind (on the W.), the Punjab (on the N.), the North-western Provinces (on the E.), and several native states of Central India (on the S.). Its total area is 132,461 sq. m., and its population is 5,398,000. The most important of the native states are Jaipur, Jodhpur (or Marwar), and Udaipur (or Mewar); next follow Uluwar (Alwar), Bharatpur, Kota, and Bikaner. This region is crossed by the Aravalli Mountains, and consists in great part of sandy, barren plains, though there are of course numerous fertile valleys and other tracts. It gets its name from the ruling race or predominant Aryan tribes, called Rajputs. They are a proud aristocracy, own the soil, and have furnished ruling dynasties to very many of the native states of India. Yet in 1851 they showed only 494 persons. At the time of the Mohammedan invasions in the 11th century the Rajputs ruled over half-a-dozen strong states—Kanauj, Ajmire, Anhilwar, Udaipur, and Jaipur. From the end of the 16th to the middle of the 18th century these states acknowledged the supremacy of the Mogul emperor of Delhi. Then they were made to recognise the Mahrattas as their masters: since the Mahrattas were crushed by the British the Rajput states are independent allies.

Rajshahi. See RAMCHAR BANGLA.

Rakoczy March, a simple but grand military air by an unknown composer, dating from the end of the 18th century (or see RANCO). It is said to have been the favourite march of Francis Rakoczy II. of Transylvania. The Hungarians adopted it as their national march, and in 1848 and 1849 it is alleged to have had the same inspiriting effect on the revolutionary troops of Hungary as the 'Marseillaise' had on the French. The air is generally known in Germany and elsewhere out of Hungary as the Rakoczy march is one by Berlioz in his Damnation de Faust; Liszt also wrote an orchestral version of the original.

Rakshas, See DEMONOLOGY.

RALEIGH

Raleigh, the capital of North Carolina, is near the Neuse River, 157 miles by rail SSW, of Richmond, Virginia. The town is situated on an elevated site, with a central Union Square, from which four principal streets radiate, each 90 feet wide. In the square stands the capital, a large domed building of granite, which cost over $500,000. It contains state institutions for the blind, deaf and dumb, and insane, and has iron-foundries, machine and car shops, and manufactories of clothing, carriages, and farming implements. Pop. (1890) 9205; (1900) 13,643.

Raleigh, Sir Walter, the typical gallant and hero of England's heroic age, was born of an ancient but decayed family at the manor-house of Hayes, near Budleigh in East Devonshire, in 1552. He was the second son of his father's third wife, who herself had been married before, and had borne her husband the famous Humphrey and Adrian Gilbert. He entered Oriel College, Oxford, in 1566, but left without a degree, most probably in 1569, to volunteer into the Huguenot cause in France. He was knighted at Tours in 1568, and on his return to England, was made secretary of state, and then ambassador to France. In 1570 he married Dorothy Walsingham, a daughter of Thomas Walsingham, Lord Treasurer of England. Almost immediately after his return he became prime favourite of the queen, whose heart was still susceptible despite the weight of almost fifty years. Fuller's well-known story of how he first caught her eye by flinging his cloak over the mire is more likely completely apocryphal, but well befits the romantic temper of the times and the manner of fantastic devotion with which the Virgin Queen loved to be adored, as it is said by the fine gentlewoman of her court. Raleigh was well equipped to serve the court: his looks and deportment, his skill in horsemanship, his wit, his readiness to save the queen's foibles, his great knowledge of the world, his wit, his sense of beauty; his tall and handsome figure, dark hair, high colour, lofty forehead, resolute and manly bearing, alert expression, and spirited wit combined to form an imposing personality, and all the advantage that nature had given him he heightened by a gorgeous splendour in dress and in jewels. But he was proud, haughty, and impatient, and everywhere, save in his native Devonshire, the broad accent of which he preserved all his life, he made himself a multitude of jealous and envious enemies. He was more confident in his Irish affairs, but never to the last took a public place in the queen's counsels, perhaps because his royal mistress, with all her fondness, distrusted his ambition, and divined that he lacked that sagacity of the statesman which she recognised in the less splendid Burghley and Walsingham. The playful name of 'Water' by which she called him seems itself to imply a recognition of that instability of character which was his constant foible and, in the fullness of time, the occasion of his ruin. But meantime she heaped favours hitherto upon him: in April 1581 he received the 1st month the 'farm of wines,' a license duty of twenty shillings a year from every vintner in the kingdom, which at one time yielded £2000 a year; and in March 1584 a grant of license to export woolen broadcloths, which Burghley estimated had yielded him in a year a sum as much as £1000. After the close of 1584 he was knighted: in July 1585 he was appointed Lord Warden of the Stannaries, in September Lieutenant of Cornwall, in November Vice-admiral of Devonshire and Cornwall; and in the same year he was elected to parliament as one of the two representatives for Devonshire. In 1587 he succeeded Sir Christopher Hatton as Captain of the Queen's Guard. During the summer of 1584 he leased of the queen the statelier mansion of Durham House, spent much money on its repair, and kept it as his town-house from that time down
to 1603. It was not till about the beginning of 1592 that he came into possession, on a ninety-nine-years' lease, of the splendid park and castle of鹘bourn, where he spent his last years.

In 1583 Raleigh risked £2000 in Sir Humphrey Gilbert's last ill-fated expedition, and on the news of his half-brother's loss took up a fresh charter of discovery and colonisation. In April 1584 he sent out a party of Spaniards and wolfs to explore the coast north of Florida. They made a pros- perous voyage, and formally possessed a district of which Elizabeth was pleased to give the name Virginia. Next year Raleigh fitted out a stronger expedition under Ralph Lane and Sir Walter Raleigh, which the Queen allowed him to live a year under Lane's command on the island of Roanoke. Returned to England in Drake's fleet completely dispirited with their hardships. Soon after they set sail, Sir Richard Grenville arrived with three ships, and left on the island fifteen men well furnished with stores. One of the hundred colonists—the first citizens of America—Thomas Harriot, in his account of the colony and the causes of its failure, speaks of the herb, 'called by the inhabitants Yppoco,' which was destined to live more than half the life of the colonists, half the world. Raleigh himself took to the new luxury, and would enjoy it in pipes of silver, the queen sitting by him while he smoked. In May 1587 he sent out three ships, under Captain Charles White, with 150 colonists, seventeen of whom were women and several were pregnant. He offered to take ten stripes or one year's imprisonment for any who deserted. But Raleigh was to have his vengeance: one year later 42,000 Spaniards landed and killed him, and many misfortune after misfortune overtook themselves. "While returned to England for supplies, and at length, after many delays and difficulties, reached Virginia in August 1590 to find the settlement mined and the colonists dispersed, never to return. This was the direct attempt of Raleigh himself at the colonisation of Virginia. The undertaking, says Hakluyt, 'required a prince's purse to have it thoroughly followed out'—it is supposed that Raleigh himself had spent forty thousand pounds upon it."

Already in May 1587 the appearance of the handsome young Earl of Essex at court had endangered Raleigh's paramount place in the favour of the queen. Hatton and Leicester long ere now had shown their jealousy of him, but this impious and scandalous boor openly defied him, and at length drove him from the court to Ireland. He had already received in the spring of 1587 a grant of 42,000 acres in Munster, and with char-acteristic vigour he at once set about repeopling this tract with English settlers. He was in Ireland when the Invincible Armada appeared in English waters, but he hastened to the south of England to superintend the coast defence, and he was present with the fleet a trusted counsellor throughout that glorious week of toil and triumph. His vessels scoured the seas in privatreching enterprises, which gratified at once his inborn hate of Spain and helped to provide the means for his vast expense and his Virginian ventures. His overzealous seamen sometimes transgressed the forbidden limit of piracy, but the Treasury winked at such accidents of war, and Bacon lamented only the lack of the plunder. Raleigh sailed with Drake on his Portugal expedition of 1589, but by the autumn of that year was again in Ireland, where he quickly became a warm friend of Spenser, with the endless fame of whose great poem his name is imperishably linked. The point had set itself on his estate at Kilmanagh three years before, and here the 'Shepherd of the Ocean' [Raleigh] visited him, and read him his poem of The Ocean's Love to Cynthia [Elizabeth], which Mr Gosse thinks must have contained at least 10,000 lines, the extant 120 stanzas being a fragment. In Colin Clancy's Come Home Again we read how Raleigh carried the poet into the presence of the queen, who took delight to hear his poem, and commanded it to be published.

In this English garden of Spain Raleigh planted tobacco, as well as the first potatoes that grew on Irish soil. He quickly recovered all his influence at court, and busied himself with further schemes for reprisals on the Spaniards. Early in February he busied himself to prepare a new expedition to seize the Spanish treasure-ships, but again his doting mistress forbade him to sail with the fleet, which he had reluctantly procured to entrust to Frobisher and Sir John Borough. Hardly had he returned before he seems to have discovered his intrigue with Bessy Throckmorton, one of her own maids-of-honour—an infidelity to her own supremacy which her jealous temper could not brook. In July 1592 Raleigh was committed to the Tower, and it was not till six years before he had any interview with his mistress' presence. He bore his imprisonment with characteristic impatience, and vexed the air with exaggerated complaints of his loss expressed in the fantastic fashion of the time. Meantime Borough had captured the Madre de Dios, a huge Spanish galleon and the richest for Spain ever captured. It was shown to the queen in September. So great was the excitement and such the rapacity of the vultures that gathered to the spoil that none but Raleigh could control the tumult. He was sent down to Dartmouth with a keeper, and Sir Robert Cecil describes with astonishment how Raleigh and his sailors and their countrymen. 'But his heart is broken,' he writes his father, 'for he is extremely pensive longer than he is busied, in which he can toll terribly.' Raleigh now married Bessy Throck- morton, and for the next two years lived with her in quiet happiness, building and gardening at Sherborne. About 1593 his imagination seems first to have been fired by the descriptions of Guiana, with its vast city of Manoa and its El Dorado, and in 1594 he sent out Captain Whiddon to Trinidad, which island he visited and described. In 1595 he himself sailed with five ships, explored the coasts of Trinidad, sailed up the Orinoco, and up his imagination set aglow for life by the tropical splendours of vegetation that he saw, and still more by the auriferous quartz and glittering stones he found, and marvellous stories of stores of gold beyond brought to him by the native Indians. Six months after his return he sent Captain Lawrence Keymis to make further explorations, and later Captain Berry, but he himself failed to raise any great public interest in England in his splendid dream of a new world and untold wealth from the mines of Guiana. Early in 1596 he published The Discovery of the large, rich, and beautiful Empire of Guiana (Hakluyt Society, edited by Sir R. Schom- burgk, 1848), a splendid piece of vigorous prose. In June 1596 the queen visited him at Hatfield; at his request she gave him £2000 and in October Howard and Essex to Cadiz, and it was his advice that governed the whole plan of action in that splendid triumph which a second time deferred the naval strength of Spain. His faults over fell from him in the year of his release, and again in Spain he showed such tact and temper as in the skilful persuasions by which he forced the Lord Admiral and Essex to agree to his plans. But he was mortified to the heart, as he lay in his ship suffering from a wound in the leg, when their lack of energy allowed the Spaniards, two days later, to burn the whole fleet of treasure-laden
RALEIGH

earracks before his eyes. His spirited Relation of Cadiz Action remains the best history of the exploit. Despite his heroic conduct, it was almost the midsummer of 1597 before Raleigh was again admitted to court and allowed to take up his place as Captain of the Guard. Cecil showed himself friendly, and, as usual, the belief in his support was in his desire for a more active opposition to Spain, Raleigh at once set himself to prepare and volunteer ships for the projected expedition, which at length, in July 1597, was permitted by the queen to set sail from Plymouth. A desperate storm compelled abandonment of the project, and, without reducing his repudiation of it, Raleigh met Essex off the island of Flores. They agreed to attack together the Isle of Fayal, and Essex sailed off first, but Raleigh reached the harbour before him, and, after waiting three days, on the fourth landed his men and carried the town by storm. Next morning the squadron of Essex made the harbour, to find all the laurels of the 'Island Voyage' already reap'd. Essex's mortification was great, and was made greater by his cold reception at home. His surlily temper grew upon him, and soon his helpless failure in dealing with Tyron's rebellion and his ignominious arrest in the streets of London brought him to the block. His hatred of Raleigh had become so desperate that he charged him, together with Cecil and Cobham, with a plot to murder him in his house—an absurd accusation, which Sir Christopher Blount, as the king's attorney-general, was commissioned to put out to colour other matters. In 1600 Raleigh succeeded Sir Anthony Paulet as governor of Jersey, and in his three years' rule did much to foster its trade and relieve its fiscal burdens. About this time also he was active in parliament, advocating freedom of trade, and of church-goings, and forgetting the repeal of the more vexatious monopolies. His Irish estates he sold in 1602 to Richard Boyle.

In the dark intrigues about the succession that followed the closing years of Elizabeth's reign Raleigh took little part, while the crafty Cecil and the faithless Lord Henry Howard got the king's ear, and for their own advantage poisoned his mind against Raleigh and Cobham. The king had long been an admirer of Essex, and no doubt knew from the beginning that Raleigh was indifferent to his courtiers. The oaparly, timid love of peace, and the whole personality of the Duke of Buckingham, far as he was his overweening conceit of his own judgment in affairs of state, were all naturally repugnant to the bold, self-reliant hero who had so long been a trusted confidant of the great-hearted queen. He met James on his southward progress at Buxley in Lincolnshire, and was greeted with a withered pun worthy of its source—'On my soul, man, I have heard but nucky of thee.' Ere long he was stripped of, or forced into resigning, all his offices, the captaincy of the Guard, the warshipness of the Stanwixes, the wine-license monopoly, the governorship of Jersey. At this time he went to the heart, and as he was at no time guarded in his tongue it is possible enough he may have in his haste spoken, or at least listened to, words expressing a preference for Arabella Stuart to the rule of the queen. Such was the only witness against him, was the miserable Lord Cobham, and he made and unmade his eight several charges with such facility as to make them of no value at all. Neither in the 'Main' nor the 'Rye' Plot was there any really adequate evidence of Raleigh's complicity, and the referee, Lord Salisbury, to allow him to be hanged for what he accises is of itself almost enough to justify belief in his innocence. 'But one thing,' says Kingsley, 'comes brightly out of the infinite confusion and mystery of this dark Cobham plot, and that is Raleigh's innocence.' Raleigh was arrested on the 17th July, and in his first despair tried to kill himself. The trial began at Winchester on November 17th, the prosecution conducted by the attorney-general, Sir Edward Coke, who disapproved his role by a brutality almost beyond belief. Raleigh's defence was splendid, and for the first time in his life he made his way into the hearts of the people, but he was cast aside after his bearing and the burning eloquence of his words. Coke could call him 'a monster,' 'a viper,' 'the rankest traitor in all England,' 'dannable atheist,' and 'a spider of hell,' and Chief-justice Popham could jeer at him as an atheist as well as traitor; but he was too great to be any further condemned. In the hero of Cadiz and of Fayal had 'a Spanish heart,' and all his unpopularity fell from him from that hour. Dudley Carleton, who heard the trial, wrote that when it began he would have gone a hundred miles to see Raleigh hanged, but ere it was closed he would have gone a thousand to save his life. Yet he was condemned to death, and only on the scaffold was his sentence commuted to perpetual imprisonment. Sherborne he had conveyed to trustees for his wife and eldest son, but an invalidity in the deed of conveyance was soon found, and the unhappy Earl of Essex was condemned. And when the king was met with the words, 'I mean has the land, I mean has it for Carr.' In January 1609 it was given to the favourite, a payment of £8000 being made as compensation. Within the Tower Raleigh employed himself with study and with chemical experiments, and was treated on the whole in a manner which has never been surpassed. When Henry came often to him, he greatly admired the noble captive: 'No man but my father would keep such a bird in a cage,' said he. But he died in November 1612, and the promise he had wrung from his father to release Raleigh the next Christmas was only remembered to forget it, with the history of Raleigh's imprisonment was his History of the World, the first and only volume of which, extending to over 1300folio pages, although coming down but to the second Roman war with Macedonia (170 B.C.), was published in 1614. It is written throughout in admirable English; but the preface is the most interesting portion, for the subject itself is dainty, though lightened by glimpses of autobiographical and occasional flashes of fire-screeching satire wrapped in ambiguous phrase. Its sale was suppressed in January 1615 as 'too saucy in censure of the present state of the empire.' To the reader writing to his son Richard, in 1650, says, 'Recreate yourself with Sir Walter Raleigh's History; it is a body of history, and will add much more to your understanding than fragments of story. The book was written for the young prince, and his death took from the author all heart to complete his work. Other writings of Raleigh's captivity were The Prerogative of Parliament (written 1615, published in 1628), which must have gored the king still further; The Cabinet Council, published by John Milton in 1628; A Discourse of War, one of his most personal, in 1624; Writing; and Observations on Trade and Commerce, an appeal for free trade, suppressed like the rest.

On January 30, 1616, Raleigh was released from the Tower through the influence of Sir Ralph Winwood and Willinges, expressly the crown's preparations for an expedition to search of a gold-mine which he maintained existed there. He engaged not to molest the dominions of the king of Spain, but he had been brought up on the old Elizabethan theory of no peace beyond the sea, and rested his faith on nothing short of gaining to gain and nothing to lose by a desperate venture, and that the gold he would bring home would gild over any formal breach of his promise. It seems difficult to understand how James can have expected that such an expedition could be made without a collision with Spain, and we find that he
RALEIGH 571

was careful to give himself the cowardly safeguard of allowing Raleigh to go with his old sentence still hanging over his head, as well as communicating his route to Guzman, the Spanish ambassador. And so in April 1618, the fleet was manned, some forty gentlemen excepted, by 'the very seem of the world, drunkards, blasphemers.' Storms, desertion, disease, and death followed them from the first, and ere they reached the mouth of the river Raleigh was himself stricken down by sickness, and compelled to stay behind with the ships, and entrust the command of the party who went to seek the mine to Keymis. He did not give his men distinct orders to avoid fighting with the Spaniards, and when they found in their way a new Spanish town, San Thome, they attacked it and burned it down but never reached the mine. In the fight young Walter Raleigh was struck down, as he shouted the words, 'Come on, my men! This is the only mine you will ever find.' Keymis lost control of his men, and came sadly back to his admirals, where no day passes without a knife cut into his heart. The men now refused to return with Raleigh to the mine, whereupon he asked them if they would follow him in an attack on the Mexican fleet, telling them in his desperation that he had his possession of the mine from France. At length, on the 21st of June 1618, he arrived at Plymouth with his ship, the Destiny, alone and utterly east down. His kinsman Sir Lewis [Julius] Stukely was sent to bring him up to London; at Salisbury on the way he feigned illness 'to forward his touch of Apology for the Voyage to Guiana. Surrounded by a ring of spies, chiefest among whom was Stukely, he again intrigued for an escape to France, but was betrayed at every step. James dared not allow him to appear before the council of state, but had formally examined before a commission of six, among them Coke, Archbishop Abbot, and Bacon, besides resorting to the infancy of sending a spy to gain his confidence and discover his secrets. In his perplexity Raleigh damaged his cause by confiding in friends and enemies, and his judges seem to have convinced themselves that he had never had any intention to find the mine at all, as appears from the Declaration of the Demeanour and Carriage of Sir Walter Raleigh, a feeble statement, though drawn up by the master-hand of Bacon. He was condemned to die the next morning (29th October 1618) on the old sentence, and neither the entreaties of the queen nor his own moving eloquence could save his life. 'You will come to-morrow morning,' he said to an old friend he met on his way back to prison; 'I do not know what to say for my life. To the part, I am sure of one.' One of his kinsmen warning him that his enemies would take exception at his high spirits, 'It is my last mirth in this world,' said he; 'I do not grudge it to me. When I come to the sad parting, you shall see me grave enough. His high courage never left him to the last. He wrote some verses the night before, and, says Dean Tousson, 'he ate his breakfast heartily, and took tobacco, and made no more of his death than if he had been to take a journey.' Of the cup of sack brought to the cell, says his secretary, 'If a man might stay by it.' The speech he made on the scaffold was masterly in its persuasive eloquence—"as he stood there in the cold morning air," says Mr Gosse, 'he falled James and Philip at one thrust, and conquered the esteem of all pesterly He asked to see the axe, and touched the edge with the words, 'This gives me no fear. It is a sharp and fair medicine to cure me of all my diseases.' To some one who objected that he ought not to lay his hands on the death which fate was weariing for him, while James even then was drawing into ever closer relations with Spain, and beginning his negotiations for the Spanish marriage. Before sailing Raleigh asked leave of the officers, in vain, to make an attack on Genoa, an ally of Spain. His vessel was manned, some forty gentlemen excepted, by 'the very seem of the world, drunkards, blasphemers.' Storms, desertion, disease, and death followed them from the first, and ere they reached the mouth of the river Raleigh was himself stricken down by sickness, and compelled to stay behind with the ships, and entrust the command of the party who went to seek the mine to Keymis. He did not give his men distinct orders to avoid fighting with the Spaniards, and when they found in their way a new Spanish town, San Thome, they attacked it and burned it down but never reached the mine. In the fight young Walter Raleigh was struck down, as he shouted the words, 'Come on, my men! This is the only mine you will ever find.' Keymis lost control of his men, and came sadly back to his admirals, where no day passes without a knife cut into his heart. The men now refused to return with Raleigh to the mine, whereupon he asked them if they would follow him in an attack on the Mexican fleet, telling them in his desperation that he had his possession of the mine from France. At length, on the 21st of June 1618, he arrived at Plymouth with his ship, the Destiny, alone and utterly east down. His kinsman Sir Lewis [Julius] Stukely was sent to bring him up to London; at Salisbury on the way he feigned illness 'to forward his touch of Apology for the Voyage to Guiana. Surrounded by a ring of spies, chiefest among whom was Stukely, he again intrigued for an escape to France, but was betrayed at every step. James dared not allow him to appear before the council of state, but had formally examined before a commission of six, among them Coke, Archbishop Abbot, and Bacon, besides resorting to the infancy of sending a spy to gain his confidence and discover his secrets. In his perplexity Raleigh damaged his cause by confiding in friends and enemies, and his judges seem to have convinced themselves that he had never had any intention to find the mine at all, as appears from the Declaration of the Demeanour and Carriage of Sir Walter Raleigh, a feeble statement, though drawn up by the master-hand of Bacon. He was condemned to die the next morning (29th October 1618) on the old sentence, and neither the entreaties of the queen nor his own moving eloquence could save his life. 'You will come to-morrow morning,' he said to an old friend he met on his way back to prison; 'I do not know what to say for my life. To the part, I am sure of one.' One of his kinsmen warning him that his enemies would take exception at his high spirits, 'It is my last mirth in this world,' said he; 'I do not grudge it to me. When I come to the sad parting, you shall see me grave enough. High courage never left him to the last. He wrote some verses the night before, and, says Dean Tousson, 'he ate his breakfast heartily, and took tobacco, and made no more of his death than if he had been to take a journey.' Of the cup of sack brought to the cell, says his secretary, 'If a man might stay by it.' The speech he made on the scaffold was masterly in its persuasive eloquence—"as he stood there in the cold morning air," says Mr Gosse, 'he falled James and Philip at one thrust, and conquered the esteem of all pesterly
Rambois, the ninth month in the Mohammedan year. In it Mohammed received his first revelation, the veil of his piety was enkindled, and he is enjoined to keep a strict fast throughout its entire course from the dawn—when a white thread can be distinguished from a black thread—to sunset. Eating, drinking, smoking, bathing, smelling perfumes, and other bodily enjoyments, even swallowing one's spit, are strictly prohibited during that period.

Even when obliged to take medicine the Moslem must make some kind of amends for it, such as spending a certain sum of money upon the poor. During the night, however, the most necessary wants may be satisfied—a permission which, practically, is interpreted by a profuse indulgence in all sorts of enjoyments. The fast of Ramadam, now much less observed than in former times, is sometimes a very severe affliction upon the orthodox, particularly when the month—the year being lunar—happens to fall in the long and hot days of May or June. Skilful doctors, therefore, at the time of war are temporarily released from this duty, but they have to fast an equal number of days at a subsequent period when this impediment is removed. Nurses, pregnant women, and those to whom it might prove really injurious are expressly excepted.

The principal passages treating of the fast of Ramadam are found in the second Surah of the Koran, called 'The Cow.'

Rámâyana is the name of one of the two great epic poems of ancient India (for the other, see the article Mahābhārata). Its subject-matter is the history of Rāma (q.v.), and its reputed author is Valmiki, who is said to have taught his poem personally to Kings of Rajput land that the story of this latter account is open to doubt, it seems certain that Valmiki was a real personage, and, moreover, that the Ramayana was the work of one single poet—not, like the Mahābhārata, the creation of various epochs and different minds.

As a poetical composition the Ramayana is therefore far superior to the Mahābhārata; and it may be called the best great poem of ancient India. Whereas the character of the Mahābhārata is cyclopedic, its main subject-matter overgrown by episodes of the most diversified nature, the Ramayana has been the object in the history of Indian Ram. Its episodes are rare, and restricted to the early portion of the work, and its poetical diction betrays throughout the same finish and the same poetical genius. Whether we apply as a test the aspect of the religious life, or the geographical and other knowledge displayed in the two works, the Rāmāyana appears the older. Since it is the chief source whence our information of the Rāma incarnation of Vishnu is derived, its contents may be gathered from the article Vishnu. The Rāmāyana contains professedly 24,000 epic verses, or Slokas, in seven books—some 1,000 verses of six-syllable measure. The text which has come down to us exhibits, in different sets of manuscripts, such considerable discrepancies that there are practically two recensions. The one is more concise in its description, has a clinging tendency than the other to that kind of descriptive enlargement of facts and sentiments which characterises the later poetry of India; it often also exhibits grammatical forms and peculiarities of an archaic stamp, where the other studiously avoids that which must have appeared an affectation in the light of a grammatical difficulty. There can be little doubt that the former is the older and more genuine text.

A complete edition of the older text, with two commentaries, was published at Madras in 1850, at Calcutta in 1860, and at Bombay in 1861. Of the later version Gorresio edited the first six books without a commentary, but with the translation, and addition (a translation of the two last books) of R. T. H. Griffin, appeared in 1870-75 in five large volumes. See Williams, Indian Epic Poetry (1863); and Weber, Uber das Rāmāyana (1870).

Rambouillet. CATHERINE DE VIVONNE, MARQUISE DE, one of the most illustrious and illustrious women of the 17th century, was born at Rome in 1588. Her father was Jean de Vivonne, afterwards Marquis de Rambouillet, whose mother, Julia Savelli, belonged to an old Italian family. Through her mother was connected with the Flor- centine banking house of Strozzi. At twelve Catherine was married to Charles d'Angennes, son of the Marquis de Rambouillet, who succeeded to the family estates and title on the death of his father in 1611. From the very beginning she disliked alike the morals and manners of the French court, and she early determined to gather round herself a select circle of friends. At once virtuous, spiritu- telle, sympathetic, and appreciative, she gathered together a circle of literary friends, and through long series of years all the talent and wit of France, and in her salon met for the first time on an equal footing the aristocracies of rank and of spirit. For fifty years she received the wits, critics, scholars, and poets of Paris: Malherbe, Racan, Nozze, Racine, La Fontaine, Fourier, Strozzi, Scarron, Saint-Evremond, Renesmera, La Rochefoucauld. But half of the glory of the Hôtel belonged to the brilliant women who frequented it, among them Madeleine de Scudéry, the beautiful Duchesse de Chevreuse, the Marquise de Sable, who inspired the Marquise de La Rochefoucauld, Madeleine de la Vergne, afterwards Madame de La Fayette, the inimitable Madame de Sévigné; but conspicuous beyond all by her splendid beauty and faultless grace, the idol of both sexes, shone the sister of the great Condé, and the heroine of the Fronde—the Duchesse de Longueville. As the centre of this group reigned the Marquise de Rambouillet—"la grande Mar- quise," the divine Arthénice—and her beautiful daughter Julie (the Parthénie de Clélie), after fourteen years of singing, wife of the Duke of Mont- cassin, who inherited the Rambouillet, La Rochefoucauld, and of Julia, a collection of love-verses, illustrated with exquisite paintings on vellum.

The frequenter of the Hôtel were celebrated for the elegance of their manners and the refinement of their language; but the latter, on the lips of initiators, degenerated into extravagant affectation and palatable pedantry—a mark for the comic satire of Mollière in Les Précieuses Ridicules and Les Femmes Savantes. It must be remembered that the title Précieuse originally meant 'distinguished' in its best sense, and that the ladies of the coterie were generally divided into two classes: the younger Madame de Rambouillet's good taste in everything was conspicuous, and she led the fashion also in the decoration of houses. Her famous 'Chambre bleue,' furnished with blue velvet relieved by gold and silver, with large windows from floor to ceiling, and her alcove with its 'esquille—at first adopted merely to save her from the heat of the fire, which she could not bear—were imitated in many a great house in France. Her importance declined under Louis XIV., who distrusted clever women, but she survived to the month of November 1693.

See the History of Tallemand des Réaux and the Dictionnaire des Précieuses of Sounzie; Riederer's Mémoire pour servir à l'Histoire de la Société polié en France pendant le Dix-septième Siècle (1854); Victor Housin's Jésuites et Jésuites, de la Bourgogne de l'Ouest, &c.; Livre des Précieuses et Précieuses (1859); Brunet-édro's Nouvelles Études Critiques (24 ed. 1886).
RAMESAU. JEAN PHILIPPE, a French musician, was born at Dijon, 25th September 1863. At eighteen he went to Milan, but soon returned to France, to Paris, Lille, and Clermont in Auvergne. Here he acted as organist to the cathedral, and wrote his Traité de l'Harmonie (1723). Removing to England in 1763, he published several works, among which were Génération Harmonique (1737), and Nouvelles Réflexions (1752). In 1733, at the mature age of fifty, he produced his first opera, Hippolyte et Aricie, the libretto of which was written by the Abbé Pellegrin. It created a great sensation, and remained on the stage for many years. Rameau's best opera was Castor et Pollux, produced at the Académie Royale de Musique in 1737. Between 1733 and 1750 he composed twenty-one operas and ballets, as well as numerous harpsichord pieces. Louis XV. created for him the office of composer of chamber music, granted him letters of nobility, and named him a Chevalier de St. Michel. Rameau died 12th September 1764. See A. Pougín's essay (Paris, 1876)—Rameau's nephew, well known as giving the original stage production of Diderot's, which Goethe thought worth of translation into German, had actual existence, being Louis Sébastien Mercier (1740-1814), author of the famous Tableau de Paris.

Ramée, De La. See Ramus, and Ouida.

Rameses, the name of several Egyptian monarchs, of whom two, the first and the second, were specially famous (see EGYPT, Vol. IV. p. 240). It is usual to identify the warrior king Rameses II. with the Pharaoh of the oppression, and Rameses III. with the Pharaoh of the Exodus, though there is some difficulty in the identification. The capital of Rameses II. was founded at Deir-el-Bahari in 1881, that of Rameses III. at Boulak in 1886. The story of Rhampsinus (q.v.) seems to refer to Rameses III. For the treasures called Rameses, see Pittom.

Ramic. See Beemneria.

Ramilholes, a village of Brabant, Belgium, 14 miles by rail N. of Namur, is memorable as the place where, on May 23, 1792, the French forces under Marshal Villeroi and the Elector of Bavaria were defeated by Marlborough, with the loss of almost all their cannon and baggage, and thirteen thousand killed and wounded. This victory compelled the French to give up the whole of the Spanish Netherlands.

Rammohun Roy. Râjî Ram Mohàn Râî, founder of the Brahmo Somaj (q.v.), was born at Râdnânga in Bengal, in May 1772, his ancestors being Brahmans of high birth. He studied Persian, Arabic, and Sanskrit, and soon began to doubt the foundations of the ancestral faith. He spent some time studying Buddhism in Tibet, and gave offence there by his frank criticisms. He incurred the enmity of his family for his religious views, and lived at Benares till 1803. For some years he was resident in Calcutta. In 1811 he succeeded to affluence on the death of his brother. He published various works in Persian, Arabic, and Sanskrit, the object of the whole being the uprooting of idolatry. His influence was powerful in securing the abolition of sati. He also issued in English an abridgment of the Ramayana. He digested the Vedas, the ancient sacred books of the Hindu. In 1820 he published The Precepts of Jesus, the Guide to Peace and Happiness, accepting the morality preached by Christ, but rejecting belief in His deity or in the miracles, and wrote other manuals for the use of the Hindu, and a Christian Trinitarianism. In 1828 he began the association which grew into the Brahmo Somaj, and in 1831 visited England, where he was received with all but universal friendliness and respect. He took a lively interest in the Reform agitation, and gave valuable evidence before the Board of Control on the condition of India, but opposed himself, and died at Bristol, 27th September 1833.

See Miss Carpenter's Last Days of Rammohun Roy (1883). The full Bengali memoir (1881); and his English works have been edited by Jyogendra Chunder Ghose (2 vols. 1888).

Ramnagar, two towns of India: (1) a town of the North-Western Provinces, stands on the right bank of the Ganges, 2 miles above Benares. It contains a palace and residence of the Rajah of Benares, which rises from the banks of the sacred stream by a number of fine ghâts or flights of stairs. There is a fort, and whips and wicker-work chairs are manufactured. Pop. 11,830. (2) A town of the Punjab, on the Chenab River, 28 miles NW. of Gujranwala. It was a place of great importance in the 18th century, being then known as Kasulnagar, but was stormed by the Sikhs under Ranjit Singh in 1795, and its name changed to Ramnagar. It is now a place of only 6580 inhabitants, who make leather vessels. A large fair is held here every April.

Rampart forms the substratum of every permanent fortification; see FORTIFICATION.

Ramphastis. See Toucan.

Rampion (Campanula rapunculus; see Campanula), a perennial plant, a native of Europe, rare in England, with a stem about two feet high, and a panicle of very pretty pale-blue bell-shaped flowers. The radical leaves are ovate lanceolate and waved. The root is white and spindle-shaped, and was formerly much used for the table, under the name of Rampion or Ramps. The plant is now little cultivated in Britain, but is still commonly grown in France for the sake of its roots, which are used either boiled or as a salad, and of its young leaves, which are also used as a salad.

Rampur, the capital of a native state of India, in the North-Western Provinces, stands on the river Kosila, 110 miles E. by N. of Delhi. It manufactures damask, pottery, sword-blades, and jewellery. Pop. (1891) 75,530. —The state, entirely surrounded by British territory, has an area of 899 (another authority gives 945) sq. m., and a pop. of 541,914.

Rampur Bâneul, chief town of the Rajshahi district (area, 2561 sq. m.) of Bengal, stands on the north bank of the Ganges, is a centre of silk and indigo trade, and has an English Presbyterian mission; pop. 21,407.

Ramsay, Allan, Scottish poet, was born in the parish of Crawford, Lanarkshire, October 15, 1856. His father was a manager of the Hopetoun's mines at Leadhills, and his mother, Alice Bower, was the daughter of a Derbyshire miner. At fourteen he was put apprentice to a wigmaker in Edinburgh, and followed that calling till his thirtieth year, by which time he had become known as a poet, having issued several short humorous satires and realistic descriptions, which were printed as broadsides, and sold in his shop or on the street for a penny each. He had also written (1716-18) two
did a very great service for the Scottish Episcopal Church by his work in connection with the Church Society, of which he was the first secretary and really the founder, and out of which grew the later Representative Church Council. But it is for the sake of the Church of this country—or rather of one of them—that his fame is secure.

Among his works, besides sermons, &c., are Memoirs of Sir J. E. Smith and Dr Chalmers, Diversities of Christian Character (1858), Faults in Christian Believers (1859), &c. In 1857 he prefixed (1861), &c. and 1869), and a number of others. But the book with which his name will always be identified is the Reminiscences of Scottish Life and Character, which had its origin in two series of famous letters (‘‘Changing Ideas and Habits’’) delivered in Edinburgh in 1856–57, and which remained in manuscript until 1921. A second series (pp. xxxvii., 221 pages) appeared in 1861. See the Memoir, by James Innes, prefixed to the 224 ed. (1874).

Ramsbottom, a manufacturing town of Lancashire, on the Irwell, 4 miles N. of Bury. The first Sir Robert Peel established calico-printing here, and it now manufactures of cottons, calicoes, ropes, machines, &c. Pop. (1861) 4194; (1851) 16,142; (1891) 16,720.

Ramsden, Jesse, a mathematical instrument-maker, was born at Salterhebble, near Halifax in Yorkshire, in 1735, and began life as a cloth-worker. About 1755 he moved to London, and shortly afterwards began to work as an engraver. His skill recommended him to the mathematical instrument-makers, the daughter of one of whom, Dollond, he married. Being of an inventive turn, he spent his best efforts in effecting improvements in the sextant, theodolite, equatorial, barometer, mercurial, and quadrant, and the like. He so improved the sextant that its range of error was diminished from 5 minutes to 30 seconds. He made the theodolite for the ordnance survey of England. He devised the mire, and made the first for Palermo and Dublin. He spent several years over an instrument for graduating mathematical instruments (see graduation), and published an account of it as Description of an Engine for Dividing Mathematical Instruments (1777). For this the Commissioners of Longitude awarded him £250. He was elected a Fellow of the Royal Society in 1766; he was president of it in 1785. He died at Brighton on 5th November 1800. Descriptions of some of his improved instruments will be found in Phil. Trans. (1779 and 1783). See Life by Lalande in Journal des Savans (1788).

Ramsey, (1) a seaport and watering-place in the north of the Isle of Man, 14 miles N.E. of Douglas, and by rail (1879) 18 N.E. of Peel. It stands on a spacious bay, with a good sandy beach and a background of wooded hills (1842 feet), and from the beauty of its surroundings and the salubrity of its climate has risen into a favourite resort of tourists and pleasure-seekers. It has two promenades, a mile and a half long, and steam-boat communication with Liverpool, Fleetwood, Glasgow, Greenock, Whitehaven, and Douglas. Pop. (1851) 2701; (1871) 3861; (1881) 4023; (1891) 4803.—(2) A market-town of Huntingtonshire, 12 miles N.E. of Huntington, it has a market and a fair. For the curacy of St Benedict’s abbey (1333). Pop. of parish (1851) 4645; (1891) 4684.

Ramsgate, a watering-place and seaport of Kent, in the south-east of the Isle of Thanet, 72 miles E. by S. of London, 4 S.E. of Margate, and 15 N.E. of Canterbury. From a small fishing village it began to increase in importance during the 18th century through successful trade with Russia and the East country, and through the
RAMUS

French grammar, rhetoric, morals, and theology all engaged his pen, and he seldom handled a subject to which he did not add some degree of elucidation. His followers were a widespread, and no less powerful body of thinkers and teachers; France, England, the Low Countries, Germany, Switzerland, Denmark, and even Spain had their Ramist.

See monographs by Waddington (Paris, 1855), Desmond (1864), and Lobster (Strasb. 1878).

Rana. See Frogs.

Rancé, Armand de (1626-1700), the founder of the Trappists (q.v.).

Ranching, the business of cattle-breeding as pursued on a large scale in the unsettled districts of the United States from the Mississippi to the Pacific coasts, and from the Bad Lands of the Upper Missouri to the Gulf of Mexico. The name is derived from the Spanish rancho, extending over 'mess' or 'mess-room,' but used in Mexico also for a herdsmen's hut, and finally for a grazing-farm, as distinguished from a hacienda, a plantation or cultivated farm. The speciality of ranching is that the territory is raised and kept in a half-wild condition, with little or no fencing or irrigation, and no artificial feeding. The life of the 'cowboys' and ranchmen, if no longer so wild and adventurous as it once was, is still sufficiently free, open, and exciting to have great charms for enterprising youths amongst whom rancheros are to be found not merely hereditary cattle-breeder and rough frontiersmen, but accomplished university-educated, in whom their scanty leisure cherishes their Old-World tastes for literature and music. To these are added not a few men whose past history would hardly bear looking into in helping to provide the materials of a strangely mixed society.

Large fortunes were made in the wild old days, but the gradual settlement of the ranching country has seriously embarrassed the business of the ranchman. The old cattle kings of the south had often ranges, under Spanish land-grants, extending over several hundred square miles, and would brand many thousand calves each year. Herds would be 'on the trail' for from two to four months, the cattle from Texas crossing Red River, and passing through Indian territory and southern Kansas to the railroad; but the gradual settlement of the country and the extension of railroads render these long trails impracticable and needless. The great events of the ranchman's year are the 'round-up,' when stock is taken, the cattle are branded, and such full-grown cattle gathered in herds—some still by the direct instigation of one of his most persistent enemies. Their annual branding, as a method of thinking, is vigorous, and his exposure of its puerile and useless subtleties is thorough. His system of logic, by which his name is marked by its logical definitions, its natural divisions, and its simplification of the rules of the syllogism; but it really adds little to logical science. What strikes one most, however, in Ramus is his universal intellectual activity.

Randall, James Ryder, the author of 'Maryland, my Maryland,' was born in Baltimore, 1st
January 1839, taught for a while in a Louisiana college, and then turned to journalism. Shut out from the army by a delicate constitution, he still gave powerful aid to the southern cause by his lyrics. These include, besides the one called for by the passage of the first Massachusetts troops through the streets of Baltimore, and the consequent bloodshed, 'Stonewall Jackson,' 'There's Life in the Old Land Yet,' and others. Since 1866 he has edited a paper in Augusta, Georgia.

Randazzo, a town of Sicily, at the northern foot of Mount Etna, with some old Norman churches. Pop. 9908.

Randers, a town in Jutland, on the Randers-Flord, 20 miles from its mouth in the Cattegat. Pop. (1870) 11,354; (1890) 16,617.

Randolph, Edmund Jennings, an American statesman, was born at Williamsburg, Virginia, 10th August 1733, studied at William and Mary College, and was admitted to the bar. In 1760 he helped to frame the constitution of Virginia, and became a prominent attorney and legislator. In 1766-68 he was governor of Virginia, and in 1787 he was a member of the convention which framed the constitution of the United States. He was working hard on a codification of the state-laws of Virginia when, in 1789, he was appointed by Washington as attorney at law of the United States. In 1794 he was made secretary of state, but after the president's signing of the Jay Treaty (1795) with England he resigned in order to be free to vindicate his own conduct. Meanwhile he was practically ruined by the responsibility which had been inerced, as part of the duties of his office, for certain funds provided for a foreign service; and, though he returned to the bar, he had to assign his lands and slaves. He died 13th September 1813. See Moncreif D. Conway, Omitted Chapters of History, disclosed in the Life and Papers of Edmund Randolph (1888).

Randolph, John, 'of Roanoke,' was born at Cawson, in Virginia, June 2, 1773. He was a second cousin of Edmund Randolph, and boasted the Indian princess Pocahontas among his ancestors. In 1799 he was elected to congress, where he became distinguished for his eloquence, wit, sarcasm, caution, and eccentricity. For thirty years he was more talked and written about than any American politician. Tall and meagre, peculiar in dress and manners, he was described as a strange mixture of the aristocrat and the Jacobin. He was the Democratic leader of the House of Representatives, but quarrelled with Jefferson, and opposed the war of 1812; he opposed also the Missouri Compromise, and stigmatised its northern supporters as 'Doughfaces'; and he sided against Jackson on the nullification question. From 1825 to 1827 he sat in the senate, and in 1830 he was appointed by the president to the diplomatic service. By his will he emancipated his numerous slaves, and provided for their settlement in a free colony. He died in Philadelphia, June 24, 1833. See Lives by Garland (2 vols. 1850) and Henry Adams ('American Statesmen series', 1882).

Randolph, Sir Thomas, a trusted agent of Queen Elizabeth I. He was born in 1532, lived abroad for safety's sake during Mary's reign, and after Elizabeth's accession was frequently employed in diplomatic missions to France, to Russia, and especially to Scotland. He was first sent thither in 1558, and at many a critical juncture for more than thirty years he preserved his master's interests. Among seven or more cases on the English courts, the Anglo-Cathedral (whose foundation-stone was laid by Lord Dufferin in 1886) and the other European churches, the native pagodas, a luna tic aylenium, the chief goal of Lower 1581 had to flee from Scotland for his life. He died in 1590.

Randolph, Thomas, poet and dramatist, belonged to a good Sussex family, but was born at his maternal grandfather's house in Northamptonshire in 1612. As a youth he studied at the minster and Trinity College, Cambridge, and was admitted to a fellowship. He early began to write, and gained the friendship of Sir Aston Cokain, Shirley, and Ben Jonson, who adopted him among his poetic sone. He seems to have lived a boisterous life, and two episodes of his own tell how he lost a finger in a brawl. He died before his powers had reached their maturity, in March 1635. He left a number of bright, fanciful, and occasionally too glowing poems, and six plays: Aristippus, or the Jovial Philosopher; The Conceived Peddler; The Jealous Lovers; The Muse's Looking-glass; Anytans, or the Impossible Dowry; and Hey for Honesty. His works were edited by W. Carew Hazlitt in 1875.

Ranelagh, this building was erected in 1742 on the site of the gardens of a villa of the last Earl of Ranelagh at Chelsea. Its rotunda was 150 feet in diameter, with an orchestra in the centre and a fountain. The chief amusement, promenading, as it was called, round and round the area below, and taking refreshments in the boxes, the orchestra performing meanwhile, is thus described by Smollett: ' One half of the company are following one another's tails in an eternal circle, like Don Quixote and Sancho Palmas, etc.; and the other half are drinking hot water, under the denomination of tea, till nine or ten o'clock at night to keep themselves awake.' But Johnson thought ' the coup d'oeil was the finest he had ever seen; ' and Walpole, whose letters contain many allusions to Ranelagh, writes, 29th June 1744: ' Every night I go to Ranelagh, which has totally beat Vauxhall. Nobody goes anywhere else; everybody goes there.' The last appearance of Ranelagh was when the installation ball of the Knights of the Bath was given there in 1802. It was closed on 9th September 1803, and built upon next year. Its site is now part of the Chelsea Hospital garden.

Ranelagh, North and South, two suburbs of Dublin, lying south of the city.

Range. See Cannon, Gunney.

Rangoon, the capital of Lower Burma, stands on the Hlinau or Rangoon River, about 20 miles from its entrance into the Gulf of Martaban. The existing city is almost entirely of modern construction, built since the British took possession of the place in 1852. The town extends along the left bank of the Hlinau, the docks being opposite to it at the suburb of Da-la, on the other side of the river. Behind the town is the large military cantonment, grouped round the fortified hill (166 feet) on which stands the Shway-Dugon pagoda, ' the most venerated precinct of Rangoon worship ' in all the Indo-Chinese countries. It is built of brick, is massively gabled, and tapers up to a cone 321 feet above the ground (see illustration under Burma). According to the tradition, it was erected in the 6th century B.C. to serve as a refuge to eight hairs from the head of Gautama Buddha. The street is regulated, but not entirely; the river is carefully embanked; there are five markets and an excellent water-supply; the thoroughfares are systematically lighted and traversed by tramway cars; and there has been an elective municipality since 1853. Forts and batteries protect the town. There are numerous official and semi-official offices, the Anglican cathedral (whose foundation-stone was laid by Lord Dufferin in 1886) and the other European churches, the native pagodas, a lunatic asylum, the chief goal of Lower
Burma, the Phayre Museum in the horticultural gardens, St. John's College, the high school, a hospital, &c. Along the river-side are numerous rice-husking-mills and sawmills. Pop. (1852) 25,000; (1872) 89,897; (1881) 134,176; (1891) 181,210. A little less than one-half are Burmese, and the rest are Chinese. The principal port in all Burma is about 86 per cent. of the total trade of that country passing in and out at this port. Its trade has grown at a wonderfully rapid rate since the British took possession of Lower Burma. In 1852 the port was entered by not more than 30 small vessels, and even in 1858 the total imports and exports together had only risen to £2,131,000. By 1878 the statistics of the port stood at 593,000 tonnage of vessels entering; value of imports £3,777,700, and of exports £4,414,300. Since 1890 the port is entered by about 1000 vessels annually of some 1,000,000 tons burden; the total imports (excluding coasting trade) are valued at about £5,000,000 a year, and the total exports at £9,000,000. The chief exports are rice, teak, indiarubber, raw cotton, and other articles mentioned in the beginning of the sixteenth century. The importation of Burmese with British India, Rangoon ranks as fourth of the commercial cities of the Indian Empire. A town has existed on the site of Rangoon since the 6th century n.c. It was always called Dagon down to the capture of the place by the Burmese sovereign Alompra towards the end of the 13th century. That prince rebuilt the place and called it Rangoon. It was taken by the British in 1825, and held until 1827; they captured it again in 1832, and have kept possession of it ever since.

Rangpur, a town of Bengal, on the Ghaghat, an arm of the Brahmaputra, and 110 miles SE. of Darjiling. It is the capital of a district in a great well-watered region, well-tilled plain of sandy loam. Pop. 14,500.

Ranjit Singh, the founder of the Sikh kingdom in the Punjab of India, was born at Gujmirwa on 21 November 1780, the son of a Sikh chief. His father died when he was twelve and his mother when he was seventeen years old. He at once began to study the code of the Sikh law, and at the age of thirty after the shah of Afghanistan had given him the province of Lahore he directed all his energies to the founding of a kingdom which should unite all the Sikh provinces under his own personal rule (see Sikh History). He died on 27th June 1839, and was procured from an Afghan prince, as the price of his assistance in war, the famous Koh-i-nur diamond (see DIAMONDS). See Sir L. Grillon, Ranjit Singh (Oxford, 1892).

Rank in the military forces of the British empire is not confined to the commissioned classes; the various grades of non-commissioned officers, and even the titles gunner, driver, sapper, or private are officially styled ranks. Lance or acting rank is a temporary advancement. Thus, a private or sapper is first made a lance-corporal, and a gunner or driver an acting-bombardier, before being permanently promoted. Until so promoted they rank only as private soldiers. Similarly a lance-sergeant is a corporal acting as sergeant, and holds only the lower rank.

Officers of the army and royal marines may hold either regimental or army rank or both. Up to 1857 there were two headquarters for the army. Afterwards a captain may be promoted in his regiment to the successive ranks of major and lieutenant-colonel, or while remaining a captain in his regiment he may become a major or lieutenant-colonel in the army by brevet (q.v.). The rank of captain is carried by the brevet or on receiving an appointment, such as assistant-adjutant-general, which carries that rank.

The several grades of General (q.v.) are also army ranks only. Local rank is sometimes conferred on an officer to enable him to exercise command over others senior to him in a certain locality (South Africa, Egypt, &c.). Temporary rank is often similarly granted, and some appointments carry temporary rank, more particularly the senior quarter-master-general in India becomes a temporary major-general while so employed, and reverts to the lower rank at the end of his five years' term of office unless promoted in the meantime. Honorary rank is held by officers of the ordnance-store and by the ordnance officers, regimental surgeons (q.v.) and riding masters. Officers of the militia, yeomanry, and volunteers also, after a certain number of years' service, receive a step of honorary rank. Substantive rank includes all rank other than army, brevet, honorary, local, and temporary rank, held by officers unless they are on the unemployed half-pay list. Half-pay rank as lieutenant-colonel (£200 a year) may be taken by an officer after seven years' service as major. Relative rank is held by army chaplains and veterinary surgeons. It is indicated by the position of the colonel on the shoulder-strap, and by attaching to the military rank with which it corresponds, and regulates rates of lodging-money, number of servants and horses, rates of fuel and light (or allowances in their stead), detention and prize-money. It does not entitle the holder to commands from the Queen, or to appointment out of guards, and, of course, it does confer any right to command. The corresponding ranks in the army and navy are shown in the following table, where the asterisks denote 'according to date of commission,' and the dagger 'junior of the rank.'
1889, perhaps the most finished of his books, certainly one of his great masterpieces of historical writing. Then he turned his attention to central and northern Europe, and wrote in quick succession Deutsche Geschichte der Zeit der Reformation (1839–47); Zweift Bucher preussischer Geschichte (1847–48; new ed. 1871–74); Französische Geschichte (1852–61); Englische Geschichte (1859–67; 4th ed. 9 vols. 1877–79), the last two treating chiefly of the same two centuries as the books on south Europe; and Zur deutschen Geschichte Wertung der Geschichte des 16. Jahrhunderts, (1881–88), a historic political work. It was an immense task, and required a masterly hand to produce it. The book is a classic of modern German historiography.

In 1868, Rankine became a professor of engineering at the University of Edinburgh, and in 1874, he was appointed professor of civil engineering at the University of Glasgow. He died on 24th December 1872. Rankine's work in engineering was significant. He made contributions to the fields of structural engineering, heat transfer, and fluid flow. He is best known for his work on the strength of materials, which led to the development of the Rankine's formula for stresses in realistic structures. His work on the steam engine was also groundbreaking, and he was one of the first to apply the principles of thermodynamics to the design of steam engines. His contributions to this field were instrumental in the development of the steam engine as a practical and efficient power source.

Another side of his nature was seen in his capital humorous and patriotic songs, collected as Songs and Fudges (1874).

Annach, a bleak, desolate moorland of north-west Pittshire, with a mean elevation of 1000 feet above sea-level, and measuring 28 miles by 15. Its surface is mostly a broad, silent, featureless tract of bog, heath, and moss, girdled by dark, distant mountains. In its western part is Loch Lydnoch (54 miles by 3; 924 feet above sea-level), which was said flat and dismal scenery. Stretching eastward from the moor is Loch Rannoch (92 miles by 8 mile; 608 feet), which is overhung by Schiehallion, contains a crannog with a later fortress, and sends off the Tummel 29 miles eastward and south-eastward to the Tay. Loch Tummel (62 miles by 3, 290 feet) is an expansion of this river, on which are also the Falls of Tummel, 20 feet high.

Ransom—corrupted from the Latin redemption— is the price paid by a prisoner-of-war, or paid on his behalf, in consideration of his being granted liberty to return to his own country. In early times, when a city or a prince received as hostage, the soldier looked for his reward in the booty he might capture, and this booty included the bodies as well as the chattels of the vanquished. The conqueror had the option of slaying his prisoner; but for his profit, he would make him his slave, or sell him for a price. It would be natural to accepting compensation from the prisoner himself, and setting him at liberty. In feudal warfare the ransoms formed a large portion of a soldier's gains; those for persons of low degree belonging to the individual captors, but those for princes or great nobles to the king. Ransoms were sometimes of large amount, more than the immediate family of the captive could pay. His retainers were then required by feudal usage to contribute; as in the case of redeeming King Richard I. for £100,000, when twenty shillings was assessed on every knight's fee, and the clergy subscribed liberally. David Bruce of Scotland was ransomed for 100,000 marks, and King John of France for £500,000, payable in instalments. After the battles of St Quentin and Grave, in the war between France and Philip of Spain, the King of France was ransomed by the Prince of Orange, Counts Egmont and Horn, and a few other superior commanders were estimated at 2 million crowns; the Duc de Longueville paid Count Horn 80,000 crowns as his ransoms. In modern warfare, where the fighting is performed by professionals, the pecuniary conditions of the ransoms have resorted to, freedom being granted to prisoners in exchange for others of corresponding rank captured on the opposite side.

Ranters. See Methodists.

Ranunculaceae, a natural order of exogenous plants, mostly herbaceous, rarely shrubs, and generally natives of cold, damp climates. Some are found within the tropics, but almost exclusively in very elevated situations. The number of known species far exceeds 1000. They occur in all quarters of the globe, but most abundantly in Europe. The leaves are generally much divided, and have dilated shining stalks. The calyx is of 3–6 deciduous hypogynous sepals; the corolla of 3–5 hypogynous petals, in very remarkable forms, as in larkspur, aconite, and colchicum; rarely absent, in which case the sepals are gaily coloured. The stamens are usually numerous; the carpels are numerous, one-celled, sometimes united into a single many-celled pistil; the ovary is superior, and the seed consists of dry achenia, or is berry-like or follicular. Acridity is the prevailing character of the order,
and the leaves of some species readily produce blisters; but this property disappears when they are dried or heated. Many are narcotic and poisonous; some are used in medicine, as aconite and hellebore. The seeds of *Nigella sativa* were formerly used instead of pepper. The fruit of the May Apple or Wild Lemon (*Podophyllum peltatum*) of North America may be eaten, but is very acid. Many of the order produce flowers of great beauty, as some species of Ranunculus (q.v.), Anemone (q.v.), Larkspur (q.v.), Peony (q.v.), Columbine (q.v.), Clematis (q.v.), &c.

**Ranunculus**, a genus of plants of the natural order Ranunculaceae; having five sepalae; five petals, with a nectariferous pore at the base of each petal, often covered with a scale; many stamenae situated on a receptacle, and ovaries accumulated into a head. The species are numerous, herbaceous plants, mostly perennial. Some of them adorn meadows with their yellow flowers, familiarly known as Buttercups; others, known by the sides of ditches, &c., is an active and powerful emetic, producing almost immediate vomiting, and capable of being used with great advantage in cases of poisoning. Yet the leaves of *R. ranunculoides* are sometimes called Pilewort and Lesser Celandine, a very common British species, adorning hedge-banks with bright yellow flowers in spring—are capable of being used as a pot-herb. Pastures in which *R. acris*, *R. repens*, &c. are very abundant are injured by them, and they ought to be diligently grubbed out; they are particularly supposed to give an unpleasant taste to milk and butter; but it is thought not improbable that a moderate mixture of these plants with the other herbage is even advantageous, and that they may act as a condiment. Their acridity is lost in drying, and they are not injurious to hay. The small tubers of Pilewort, or Lesser Celandine, are used for the cure of haemorrhoids; but their acridity also disappears when they are boiled, and they are then a pleasant article of food. *R. aquatilis*, a British species, very abundant in streams in many parts of Britain, is eaten with relish by cattle, the acridity so general in the other species being wanting in it.

**Ran des Vaches** (in German, *Kuhreigen*), a name applied to certain simple native melodies of the Swiss Alps, which are usually sung by the herdsmen, and played by them when driving their herds to and from the pasture, on the Alphorn or Kuhhorn (q.v.). The associations of pastoral life recalled by these airs to the Swiss in foreign countries have been said to produce an almost irresistible longing for home, or nostalgia.

**Rap** (contracted from *rappace*, 'an Irish plunderer'), familiar in the phrase 'not a rap,' was a counterfeit Irish coin of the time of George I., which passed for a halfpenny, though not really worth a fourth of that value. There was also a small Swiss coin called *rappen*, worth a centime.

**Rapallo**, a winter health-resort of Northern Italy, 17 miles by rail ESE. of Genoa, with a castle and the pilgrimage church of the Madonna (1537) on the Monte Allegro. Off here the Venetian fleet defeated the Genoese in 1491. Pop. 7625.

**Rape**, or **Coleseed** (*Brassica napus*; see *Brassica*), an annual plant much cultivated on account both of its herbage and of its oil-producing seeds. It is a native of Europe and perhaps of England; but it is hard to say where it is truly indigenous and where naturalised. It is so nearly allied to *Brassica rapa* (Turnip), *B. campestris* (Swedish Turnip, Colza, &c.), *B. oleracea* (Kale, Cabbage, &c.), and *B. prae co* (Summer Rape) that botanical distinction is difficult, particularly as to some of the cultivated varieties. The root of rape is slender, or, when cultivated sometimes becomes carrot-shaped (see *Nayew*), but it never becomes turnip-shaped. The cultivation of rape is very general in many parts of the continent of Europe, from which it seems to have been introduced into England at least as early as the 16th century; and in the 17th

---

**Rape** *Brassica napus*; a, whole.
RAPE

century, if not sooner, large quantities of oil were made from its seeds, chiefly in the fenny and other alluvial districts of the east of England, where also it has long been most extensively employed for feeding sheep. On the Continent it is not unusual to sow rape in order to green-manuring, ploughing it in, and it is also extensively cultivated in the chalk and chalk districts of the south of England. When cultivated for green-manuring rape is usually sown broadcast, but when intended to produce seed it is generally sown in drills, and receives manure and culture the same as the turnip. In rich soils rapeseeds are found useful in preventing weeds, for four feet, so that the sheep turned in are hidden beneath the leaves, and seem to eat their way into the field. They eat the stalks even more greedily than the leaves. A too exclusive feeding on rape is, however, apt to produce diseases, which a small dressing of salt, a handful of hay, is often found useful in preventing. When the seed is ripe rape is cut with the sickle; and, after a short time allowed for drying, the seed is threshed out, when the floral is often burned, a wasteful practice, as its decay affords more abundant and useful manure, and also it helps to prevent, if not, the mass of seeds from which oil has been obtained by crushing, is used for feeding oxen and sheep, but is very inferior to linseed-cake and some other kinds of oil-cake. Ground into dust, it is a very valuable manure. Rape-oil is extensively used for machinery and for lamps; but the oil and cake so-called are not exclusively obtained from this plant, nor are the names Colza-oil and Rape-oil used to discriminate the produce of different plants, although in some parts of Europe the name Colza is given to varieties of Brassica napus and B. oleracea, which are cultivated in the same way as rape. B. pretiosa is also cultivated in some places, being sown in spring and reaped in autumn. The seeds of other cruciferous plants are also crushed indiscriminately with these, and the oil and cake sold by the same names (see Oils, OIL-CAKE).—The name of the plant, rape, is through the French from the Dutch *koolzaad*, *kale-seed*.

*Rape* is having carnal knowledge of a woman without her conscious consent, and such consent must not be extorted by violence or threats of violence. The Criminal Law Amendment Act, 1885, provides that a man is guilty of rape if he persuades a woman’s husband he succeeds in having connection with her. Previously the point was doubtful. A husband cannot under any circumstances commit rape on his own wife, her consent at marriage being irrevocable; but Mr Justice Stephen in *R. v. McLean* (1879) said: The attempt to have unlawful carnal knowledge of a girl under fourteen is at all events attempted in the case of a girl between thirteen and sixteen (save when the accused reasonably believes her to be over sixteen), or in the case of any female idiot, under circumstances which do not amount to rape, are misdemeanours, punishable by two years’ imprisonment with hard labour. The mere presence suffices to constitute the crime. As regards evidence in cases of this sort, the most important question will usually be, How far is the supposed injured person to be believed? That depends on many things, of which the chief are (1) her character for truth as a matter of course, since every· girl might be compelled to submit to outrage, yet in fact if the chief witness is shown to be untruthful the charge almost invariably breaks down; (2) the time within which and the person to whom she made the first complaint; (3) any marks found on her dress or person; and (4) any marks of violence on her dress or person; (5) any marks of violence on her dress or person; (6) any marks of violence on her dress or person; (7) any marks of violence on her dress or person; (8) the scene of the alleged crime, and the probability of strenuous resistance attracting public notice; (9) whether the prisoner fled or not; (10) any marks of violence on her dress or person. (11) If one who after consenting resists too late, or who tries when by any accident the fact of connection becomes known to whitewash her character.

The law which protects women against the class of crime of which rape is the chief has been made much wider by the Criminal Law Amendment Act of 1885, which contains provisions against various kinds of procurement. As regards the abduction (1) of a woman on account of her fortune; (2) by force with intent to marry; (3) of an unmarried girl under the age of eighteen with intent to have carnal knowledge of her, it need only be remarked that the first two are felonies punishable by fourteen years’ penal servitude, and the third a misdemeanour punishable by two years’ imprisonment with hard labour.

In the United States the crime is everywhere treated as a felony, and punished with imprisonment for life or for a number of years; but the punishment is somewhat different in the different states of the Union. See also *Abduction*.

**Raphael Santi**, born at Urbino in 1483, died at Rome 1520, was the son and pupil of Giovanni Santi, a painter, whose death took place in 1494. Apprenticed to his father in 1495 at Perugia, he learned his profession from Perugino, and became such a clever imitator of his style that to this day the early pictures of the disciple are confounded with those of his teacher. Raphael, in fact, copied Perugino’s drawings (Academy of Venice), helped to work at Perugino’s pictures, and finished all the pieces from Perugino’s designs. Examples are the Resurrection of the Virgin and the Virgin and Child, with and without attendant saints, at Berlin. The presence of Raphael during these years at Perugia, Urbino, and Città di Castello may be traced in the existing collections and in private places. His first patrons were the Duke and princesses of Urbino, ecclesiastical corporations at Città di Castello, and ladies of the high families of Baglione and Oddi at Perugia. His earliest commissions were those of Città di Castello, where (1502-3) the most important of his early works, the Crucifixion in the Dudley collection, was painted. An Assumption of the Virgin, now at the Vatican, was executed shortly after for Maddalena degli Oddi. Distinct features in these pictures are a great independence as to form on Perugino and Pinturicchio, combined with a feeling for grace and pure colour essentially original. In a Marriage of the Virgin of 1504 (Milan gallery), these qualities are found in conjunction with exact repetitions of Perugino’s figures. It is probable that about 1504 Raphael began to discern the
advantage of greater independence. His predellas of the Vatican Coronation, and especially the Epiphany of that series, already display some acquaintance with the more advanced methods of the time, for some time longer the paramount influence of Perugino remained manifest, and Raphael showed Peruginesque influence in such pictures as the Connectable Madonna, now at St Petersburg, the Vision of the Knight in the National Gallery, the little St Michael and St Catherine, or the Assumption of the Louvre, and the Graces belonging to the Duc d'Annalle at Chantilly. The painting of the Graces is obviously connected with a journey which Raphael made to Sienna in 1505, when he gave assistance to his friend Dati, painting the frescoes for frescoes in the Piccolomini library. It was there that he copied the Graces, of which the sketch is preserved at the Venice Academy. At Sienna Raphael probably heard of the competition between Leonardo and Michelangelo, who were rivals in 1505 for the decoration of the town-hall of Florence, and there is good cause for thinking that he accompanied Perugino to that capital to be near the lists of this artistic tournament. But before starting he probably took commissions, which gave as a final result the Virgin, Child, and Saints, in full length, called D'Amico, now in the National Gallery, and the Virgin and Child with four saints, called the Madonna of Sant' Antonio, belonging to the Ripalda family, both of which were delivered at Perugia. The Madonna of Terranova, a group of half-lengths at the Berlin Museum, i.e., the one which Raphael was now on the path which Perugino had trod before him, had a painting-room at Florence and a painting-room at Perugia, but was not satisfied as his master had been with that finality which caused Perugino to remain stationary in the rut of an old style. He determined to acquire and assimilate some of the boldness of Michelangelo, and the principles which Leonardo had been teaching to the students of his academy at Milan. When, after a short absence at Florence, he resumed work on the Annsele and Sant' Antonio Madonna, he appears much as he could of the new spirit which was in him to those compositions, without being able to alter their archaic character. In the second of these pictures some heads, recast in a new mould, reveal the influence of the Vicenza, for it is certain of Raphael that, after witnessing the struggle of that master with Michelangelo, he came for a time to the conclusion that Leonardo was the better man so far as grace and expression were in question, though for action the spirit of Michelangelo might be preferable. The Terranuova Madonna shows the struggle in which Raphael was engaged. It has the brightness and sweetness of the Umbrian with the breadth of execution of the Florentine. But similar characteristics distinguish the five small predellas which once formed part of the Madonna; the predella for the Monti, in Lord Lansdowne's collection at Bowood, and part of the predella of the Annsele Madonna, display the influence of the works of Masaccio, Filippino, and Ghirlandajo. It is not historically proved that Raphael and Da Vinci worked together, and all the pictures which left Raphael's easel at Florence in 1505-6 recall Leonardo in expression, concentration of lines and light, tempered atmosphere, and subtle combinations of movement and light. Examples are Madonnas and Holy Families, of which the most conspicuous are that of the Gran Duca, the small Cowper, the Cardellino, and Casa Temp., at Florence, and the Virgin in Green at Vienna. But in portrait more than elsewhere the lessons of Da Vinc are visible, and the likeness of Maddalena Doni at Florence is inspired by the Mona Lisa of the Louvre. Of special interest to Englishmen was a campaign of Raphael's, in which he was sent by the Duke of Urbino to Henry VII. of England, in return for the garter given by that prince to Guidubaldo of Montefeltro. Attractions in other ways are the painter's own likeness at the Ullizi, in which we discern that the grace of his art was also displayed in Raphael's person, the Madonnas of Orleans, of the Palm, of St Petersburg, and Canigiani, in which Raphael finally appears as a pure Tuscan familiar with the arts of all his Florentine contemporaries. The Entombment to which Raphael now turned his attention is one of Assunta Baglioni and recalls in many ways the misfortunes which attended the worthless family of that name, which had so long governed Perugia. The sketches for the picture contain incidents that remind us of a massacre in which Atalanta lost her son. The picture in the Borghese palace is an embodiment of all the new principles which Raphael acquired at Florence, realizing the perfect drawing of Da Vinci and the sculptural shape of Michelangelo, allied to Peruginesque softness, and colour such as only Raphael could give. The result is perhaps a little less delightfulness, but the colouring is now at its height. The predella representing Hope, Faith, and Charity. As this fine work advanced to completion Raphael became very evidently attracted by the style of Fra Bartolommeo, and, under the influence of that master of monumental painting, he brought in part to perfection the Apostles and the Magdalen of the Eternal, in a fresco at San Severo of Perugia, whilst he composed and finished the Madonna del Baldecchinio at Florence. During the progress of these works Raphael got into a large practice at Florence, where he reigned supreme in the absence of Perugino, Leonardo, and Michelangelo. Some of the best work of his Florentine period was now produced—the small Holy Family with the Lamb at Madrid, much in the spirit of Da Vinci; the St Catherine of the Louvre; the Bridgewater and Colonna Madonnas; the Virgin and Sleeping Infant of Milan; the Raphael and the Madonna of the Bella Giardiniera, and the Esterhazy Madonna. From the days of Giotto and Masaccio to those of Raphael Rome had always attracted to its centre painters and sculptors of acknowledged skill in their cities. In this city of Michelangelo, Raphael became the great master of his age. The days of the Medici were waning, and the new Medici, the Farnese, felt the influence of the Vatican and the French court. But to Raphael's art the Farnese contribution was slight. Though not the only one, he was the best of the followers of the Anti-Secular faction the Farnese supported, and it was to Raphael that the Farnese turned when they needed a new artist for the decoration of their palace. In 1511, the Medici were exiled from Florence, and the Farnese occupied the palace. The Farnese were the last of the independent Medici, and Raphael was the last of the independent painters. Raphael's engagement to paint the 'Camera' of the Vatican is now fixed with certainty as 1509. In the ceiling of the chamber of the Signaturc the space is divided into fields, in which the Temptation, the Judgment of Solomon, the Creation of the Universe, and Mary and Abimelech are inserted side by side with medallions enclosing allegories of Theology, Philosophy, Justice, and Poetry. All these pictures exhibit an expanded style, in which the spirit of Perugino, quickened by the splendour of Leonardo and Fra Bartolommeo, becomes associated with the antique. Never before had the artist had such an opportunity of study as now. When at Rome he was enabled to visit the treasures of old sculpture and
RAPHAEL SANTI

genius at the Vatican, and the collections of the cardinals Rovere and Medici. On the walls of the
camera Raphael began the Disputa, in which he represented the Eternal, Christ, Mary, and the
apostles and angels presiding in heaven over the sages of the earth. It became legendary;
noteworthy in this madcap rendering of form, and
Published so that by a pictorial license the pontiff is present as the scenes are enacted. The death of Julius early in
1513 but slightly interrupted the labours of the painter, who gave a noble rendering of Leo X.
and his suite in the picture of the Defeat of Attila.
The Deliverance of Peter, which closed the decora-
tions, was an effective piece of composition, in which Raphael for once indulged in contrasts of
torch and moonlight and glare balanced by power-
ful glow. The constant employment of disciples
enabled Raphael, in the three years which elapsed
between the completion of the two chambers—i.e.
between 1511 and 1514—to finish the Madonna di
Pellegrino at the Palazzo Sangallo at Foligno, the
Galatea of the Farnesina, and the Sibyls of the
Pace, not to speak of the mosaics of the
Popolo ordered by Agostino Chigi. In many
of these works Raphael’s style is equal to that of
Michelangelo at the Sixtine, with the additional
charm of a more practical style. The audience
of the antique under contribution with great skill
and success, and his art was that of a master who
works without hesitation because ready for every
form of effort that can be required of him. In
a graver mood he also painted at this time the severe
Madonna of the Fish at Madrid, in a playfully
sweet mood the Madonna della Sedia at Florence;
whilst in portraits such as Altoviti at Munich, and
Inghirami at Florence, he rises to the perfect
rendering of features and expression which finds
its greatest triumph in the Leo X. of Florence.
Raphael, who had been greatly favoured by Julius,
became a personal favourite of Leo, who selected
him to succeed Bramante as architect of St Peter’s
in 1514, and afterwards made him inspector of
Roman ruins. But he was as impatient as his pre-
decessor to get the Vatican chambers finished, and
the successive succession of popes interfered with his
plans. He worked at the frescoes of the Camera dell’ Incendio, which all illustrate
scenes from the lives of Leonicin popes: the
Fire of Borgo, in which all the remants of Roman
buildings known to Raphael are introduced, the
Battle of Ostia against the Saracens, the Corro-
mination of Charles V, the Siege of Bologna,
but Raphael was now too busy to attend per-
sonally to wall-painting, and much of his attention
was taken up with the composition of the cartoons
which he executed, with help from assistants, for
the tapestries of the Sistine Chapel. It would be
impossible to describe these masterpieces or the
tapestries made from them in the space here at our
command. The cartoons may be seen at the
Kensington Museum, the tapestries at the Vatican.
They are masterpieces worthy of a pilgrimage; the
first completed in December 1516, the second
woven at Brussels in 1519. At this period of his
career Raphael was a welcome guest in the best
circles of Rome, painted the likenesses of the
pope’s relatives, Giuliano and Lorenzo de’ Medici,
and was asked in vain for pictures by the Duke of
Ferrara. His portraits of the Duke of Urbino,
Castiglione, and the Duke of Mantua are among the
most famous of Cardinal Bibiena’s rooms at the Vatican tell of
the company which he frequented. When Leo X.
succumbed to Francis I. after Marignano Raphael
followed the pontiff to Florence and Bologna, and
found there the new patrons for whom he executed
the Sixtina Madonna, the St Cecilia of Bologna,
and the Ezechiel of the Pitti. The labours subsequently completed were immense, including the Spasso at Madrid, the Holy Family and St Michael, which the pope sent to the king of France in 1518, and the likeness of the vice-queen of Aragon, followed by the celebrated portrait of the violin-player of the Sciarra collection at Rome. Wall-painting, with help from the assistants, was diligently carried on, and produced the cycle of the Psyche legend at the Farnesina, the gospelscenes of the Loggie of the Vatican, and the frescoes of the Hall of Costabili at Tivoli. The last work done in the master's painting-room was the Transfiguration, which was nearly finished when Raphael died of a pernicious fever caught in the excavations of Rome. He expired on the 8th of April 1520, after a week's illness.

Raphae, or EGGSOMUS, is a disease which was much more prevalent some centuries ago than it is at present. The name raphania was first given to it by Linnaeus, who thought the morbid symptoms were dependent upon the mixture of Raphanus raphanistrum, or jointed charlock, with the wheat used as food. It was suspected, as early as the 16th century, that the disease was due to the development of a fungus in the grain, and this fact is now established beyond doubt, although some writers hold (as Linnaeus did) that this morbid state is also produced by the presence of poisonous plants, especially Lathyrum temulentum, or darnel, among the grain. Deficiency of proper food probably contributes to cause the disease, for it rarely occurs when ergot is used medicinally. Although rye is the ordinary seat of the poisonous fungus, wheat, rice, and other grains are liable to be similarly affected, and to produce similar symptoms.

There are two forms of the disease—the spasmodic and the gangrenous. In both, symptoms of irritation of the digestive organs are the first to appear. In the spasmodic form tingling or itching of various parts of the body, with loss of sensation in the feet and hands, are the most constant symptoms. Violent contractions of the muscles may occur, giving rise to intense pain, and sometimes epileptic convulsions supervene. In the gangrenous form the extremities are painful, red or blue, and the skin distended; and after a varying time gangrene supervenes. With regard to treatment, the main thing is to replace the poisonous flour by easily digested, wholesome food. Whatever be the form of treatment adopted, the mortality in the gangrenous form is usually 90 per cent. The spasmodic form is much less destructive to life.

Raphia, the name of a group of palms (see Vol. VII. p. 722), the leaves, bark, and pitch of which found various applications. The best of one South American species, R. toedora or Jupati-palm, is largely used by gardeners everywhere for tying up plants, in fastening grafts, &c. And the midrib of the leaves of another species, found in Madagascar, &c., are supposed to be what was used for roc's quills, the feathers of the fabled Roc (q.v.).

Raphoe, a market-town of Donegal, 15 miles SSW. of Londonderry. Its former see was united to Derry in 1835. Pop. 980.

Rapidan, a river of Virginia, and tributary of the Rappahannock (q.v.).

Rapids. See Waterfalls, River, Niagara, Nile, Parana.

Rapiers, light, highly tempered, edgeless, thrusting weapon, finely pointed, and about 3 feet in length. It was for long the favourite weapon in duelling, and was worn by every gentleman. At present it is worn only on occasions of court ceremonial, and answers no other purpose than to recommend the wearer. Instructions for fencing (q.v.) are for fencing with the rapier or foil. See SWORD.

Rapin de Thoryas, Paul de, a French historian, was descended from a Protestant Savoyard family, which settled in France in the 16th century, and was born at Cauterets, in the Pyrenees, about 1627. He was educated at the Protestant college at Saumur, and passed as advocate in 1679, but had no liking for the profession; and when the revocation of the Edict of Nantes (1685) forced him to leave France he sought employment without success in England, and afterwards in the Low Countries, where he enlisted as a corps of volunteers at Utrecht, formed by his cousin, Daniel de Rapin. With his company he followed the Prince of Orange to England in 1688, was made ensign in the following year, and distinguished himself by his bravery at the siege of Fort L'Isleworth, and at the siege of Limerick, where he was shot through the shoulder by a musket-ball. In 1693 he was appointed tutor to the Earl of Portland's son, with whom he travelled in Holland, Germany, and Italy, after which he took up his residence at the Hague. He died in 1727 with his family in Wesel, where he devoted the remaining seventeen years of his life to the composition of his great work. The severity of his labours is believed to have shortened his days. He died May 16, 1725. Rapin's Histoire d'Angleterre was published at the Hague in 8 vols. the year before his death. It was undoubtedly, as Voltaire has said, the best work on English history that had until then appeared; full, minute, careful in the citation of authorities, clear, rapid, and accurate in narration, methodical in arrangement, and at the same time, comparatively impartial in spirit, and yet betraying on the part of the author an honourable reverence for law and liberty.

Rapin begins with the invasion of Britain by the Romans, and ends with the accession of William III. The work was continued to the death of William III. by David Imray (Hague, 2 vols. 1731). The best edition of the Histoire in its augmented form is by Lebrevo de Saint-Maur (Hague, 16 vols. 1749 et seq.). The original was translated into English by the REV. Nicholas Tindal (London, 15 vols. 1725-31), and subsequently by John Kelly (in 2 vols. fol.).

Rapp, George, founder of the Harmonists, also known as the sect of Economists, was born in Wurttemberg in 1727, and in 1756 he attempted to restore the church of New Testament days in Germany, emigrated with his followers to America in 1803 and settled in Butler county, Pennsylvania. There he established a settlement which he named Harmony. In 1815 the community removed to Indiana and in 1827 the tract of land on which it was sold in 1834 to Robert Owen, and Rapp and his followers returned to Pennsylvania, where, on a tract of 2400 acres forming Harmony township, in Beaver county, they built the village of Economy, on the right bank of the Ohio, 17 miles N.W. of Pittsburgh. There they engaged in manufactures and agriculture, and there Rapp died 7th August,
Rapp, Jean, Count, a French general, was born at Colmar, in the French department of Haut-Rhin, 27th April 1772. He was intended for the clergy, and, having commenced artillery, he married a woman who bore him a son, and would not leave him until he could enrol himself (1788) in the mounted ‘chevaux’ of the French army. Rapp distinguished himself by dashing gallantry in Germany and Egypt, and on the death of Desaix at Marengo he became aide-de-camp to Napoleon. His brilliant charge at Austerlitz upon the Russian imperial Guard was rewarded with the grade of general of division (1805). For his services at Loban he was named a Count of the Empire (1809). He opposed the Russian expedition, but accompanied the Emperor throughout the whole of it. His obstinate defence of Lissa (1810) a year after Napoleon’s victory at Austerlitz, and the cruel Russian army gained for him greater renown, and his chivalrous and considerate treatment of the unfortunate inhabitants during the siege was warmly appreciated by them. The Russians, contrary to the articles of capitulation, sent Rapp and his garrison prisoners to Russia, and he did not return to France till July 1814. On reaching Paris he was well received by Louis XVIII; but in 1815 he went over to his old master, and was appointed commander-in-chief of the army of the Illyrian peninsula. After Waterloo Rapp again submitted to Louis. He re-created a peer of France (1819), he held various offices about the court, and died at Paris, 8th November 1821. See his Memoirs (1823), and Spach’s Biographies Anecdotiques (1871).

Rappahannock, a river of Virginia, rises in the Blue Ridge of the Alleghany Mountains, receives the Rapidan (above this point it is sometimes called the North Fork), and flows about 125 miles south-east to Chesapeake Bay. It is tidal and navigable to Fredericksburg. The Rappahannock and the Rapidan were the scenes of some of the bloodiest battles of the war at Fredericksburg, Chancellorsville, and the Wilderness.

Rappe (Fr. râpé), a coarse kind of stuff. See TOBACCO.

Raperswy, on the north shore of the Lake of Zurich, has an old castle fitted up in 1869 by a Polish nobleman as a Polish National Museum; pop. 2900.

Raratonga. See COOK ISLANDS.


Ras (Heb. rosh), an Arabic word, signifying ‘head’, ‘promontory’, occurs in the names of many cape on the Arabian and North African coasts, and also in Sicily and Malta.

Rashes, affections of the skin, characterised by a red superficial efflorescence, diffused or in patches, disappearing under pressure, and usually ending in desquamation. To this division of cutaneous disorders belong Measles, Scarletina (or Scarlet Fever), erysipelis, erythema, roseola (or Infantile Rash) and Nettle Rash. It is a pity these rashes Measles, Scarletina, and erysipelis rather to be regarded as fevers or blood diseases than as cutaneous diseases in the true sense of the phrase.

Rashi (from the initials of Rabbi Shelomo Izaki, often erroneously called Jarchi), the greatest Jewish biblical exegete, was born about 1040, at Troyes, in France. Philosophy, medicine, astronomy, civil and ecclesiastical law, and exegesis were the chief branches of his learning; and to a rare proficiency in them he united a complete mastery over the whole range of Scripture. In the spirit of Rashi’s intellect further to perfect himself for his gigantic task he travelled for seven years, visiting the schools of Italy, Greece, Germany, Palestine, Egypt. His chief work is his Commentary on the whole of the Old Testament. Rashi’s style is extremely brief and concise, and often and passionately obscure and abstruse only to those who lack the necessary preliminary knowledge. According to the fashion of its day, it is replete with allegorical or rather poetical illustrations, gathered from the wide fields of the Midrash within and without the Talmud. This Commentary—entirely translated into Latin by Breithaupt, and partly also into German—was the first book ever printed in Hebrew (Reggio, 1474). Of his numerous other works may be mentioned his Commentary on the Babylonian Talmud; a Commentary to the Pirke Aboda; the Purades, an account of the origins of the Jewish Calendar; Legal Votes and Decisions; a Commentary on Midrash Rabbah; a Book of Medicine; and a Poem on the Unity of God. He died 13th July 1105; and such was his piety and his surpassing eminence that later generations wove a shining garland of legends around his head.

Rask, Rasmus Christian, philologist, was born at Brindekilde, near Odense, in the island of Funen, 22d November 1787, studied at Copenhagen, and in 1808 published his first work on the rules of the Icelandic language. During the years 1807-12 he occupied himself with drawing up grammatical systems of the Indo-European stock, Sanskrit, Slavonic, and Romance tongues, and in comparing them with those of India. He then visited Sweden, and in 1813 proceeded to Iceland, where he lived for three years. On his return to Copenhagen he was appointed sub-librarian to the university, and in 1818 published his splendid researches concerning the origin of the Icelandic language. After spending a year (1817) in Stockholm, where he published his admirable Anglo-Saxon grammar and the first critical edition of the Snorra Edda and the Eddie Saaemundar, he went to St. Petersburg, and there devoted himself to the study of all the oriental languages, principally Sanskrit, Persian, and Arabic, while at the same time he also acquired a competent knowledge of Russian and Finnish. Thus equipped, he proceeded to Astrakhan, and then commenced a journey through the country of the Turkmans and the Caucasins, Persia (adding meanwhile the Mongol and Manch exhibited to his already enormous linguistic acquisitions), and finally Ceylon, where he made himself acquainted with Singhalese and Pali, and wrote his Sinhalese Skryfinare (1822). In 1823 Rask returned to Copenhagen, laden with learning and rare manuscript treasures, of which the greatest part was presented to the university. In 1825 he was appointed professor of Literary History, in 1828 of Oriental Languages, and in 1831 of Icelandic. But his immense labours had exhausted his energies, and on 3rd, 14th January, 1831, at the early age of forty-five, a victim of hard work. Rask also wrote on Frisian grammar (1825), on ancient Egyptian chronology (1827), on Hebrew chronology (1828); grammars of several languages, and a great number of miscellaneous articles in the learned journals of the North, was the editor after his death, and published (3 vols. 1834-38). There are English editions of his Anglo-Saxon,
Danish, and Icelandic grammars. See the Lives by Petersen (1870) and Rönning (1887).

Raskolnik, the name of a variety of sects in the Russian Church. See Russia.

Raspail, François Vincent (1794-1878), a French chemist, doctor, and revolutionist, whose compulsion system (1845) was a forerunner of anti-soporifics. See a monograph on him by Saint-Martin (Paris, 1877).

Raspberry (Rubus Idaeus), the most valued of all the species of Rubus (q.v.). The characters of the leaves, flowers, and fruit of raspberry are well illustrated in the accompanying figure. The wild raspberry has scarlet fruit, and is found in thickets and woods throughout the whole of Europe and the north of Asia. It is common in Britain. The raspberry has long been in cultivation for its fruit. There are many cultivated varieties, with red, yellow, and white fruit, much exceeding the wild kind in size. The root is creeping, perennial; the stems only biennial, bearing fruit in the second year, woody, but with very large pith. Plantations of raspberries are most easily made by means of suckers. The raspberry loves a light rich soil, and is rather partial to a shady situation. The tall kinds are unsuitable in situations much exposed to winds, as the stems are easily broken. The rows are generally about 4 feet apart, the plants 3 to 4 feet apart in the rows. The young stems are thinned out to allow free access of air to those which are left. Stakes are often used to support the stems, or they are variously tied together. The fruit is used for dessert; for jams, jellies, &c.; for making or flavouring many kinds of sweetmeats; and, mixed with brandy, wine, or vinegar, for the preparation of Raspberry Syrup, Raspberry Vinegar, &c. Different preparations of it are used in medicine in cases of fever, inflammation, &c. Raspberry vinegar is a particularly grateful and cooling drink in fevers. Raspberries, fermented either alone or along with currants and cherries, yield a strong and very agreeable wine, from which a very powerful spirit can be made. Some of the other species of Rubus most resembling the raspberry produce also agreeable fruits. R. odoratus is a highly ornamental shrub, a native of Canada and the northern states of America, frequent in European and American gardens, but rarely produces fruit in Britain.

Raspe, J. E. See Munchausen.

Rassam, Hormuzd, Assyriologist, was born, the son of Chaldean Christian parents, at Mosul in Mesopotamia in 1826. He gained the friendship of Layard, and assisted him in his excavations at Nineveh in 1845-47 and 1849-51, and then succeeded him, until 1864, as British agent for conducting Assyrian explorations. His greatest success was the finding of the palace of Assur- bani-Pal (Sargon of Asshur), after holding in the following years political offices at Aden and Muscat, he was sent (1864) by the British government to Abyssinia, to demand the release of the Europeans kept in prison by King Theodore; but that potentate cast him into prison, and only released him with the rest of his captives after his army had been defeated by Sir R. Napier in 1868. From 1876 to 1882 Rassam was employed by the trustees of the British Museum in making explorations in Mesopotamia, and discovered Sepharvaim (Sippuwa) and Raschaspal. He wrote The British Mission to Theodore, King of Abyssinia (1869).

Rastatt, or RASTADT, a town and first-class fortress in Baden, stands on the Murz, 3 miles from its junction with the Rhine, and 15 miles SW. of Carlsruhe. Steel wares, beer, and tobacco are manufactured. From 1725 to 1771 the town was the residence of the Margraves of Baden-Baden. It is a fortification on an island in the Rhine, and of great strategic importance. It was captured by the French in 1794 and 1795, and held by the Austrians from 1803 to 1809. It was retaken by the French in 1813, and held by Austria in 1814. In 1840-48 by Austrian engineers to protect the northern entrance to the Black Forest. Rastatt is memorable for two congresses—the first in 1714, when a treaty of peace, which brought the war of the Spanish Succession to a close, was signed between the Emperor, Archduke Ferdinand, and Michael Eugene; and the second in 1797-99. On the breaking up of this latter congress without any definite result the three French plenipotentiaries set out for Strasburg; but they had scarcely got beyond the gates of Rastatt when they were attacked by Austrian horsemen, and two of the three slain, whilst the third was left for dead in a ditch. Their papers were carried off, but no further spoil was taken. It seems that the Archduke Charles gave orders to the horsemen to drive the French representatives out of Rastatt and take away their papers; the killing was the work of the officers, misunderstanding their orders. The town played a prominent part in 1849 as the stronghold of the revolutionists in Baden. Pop. (1890) 11,570.

Rat, a name applied to the larger species of the rodent genus Mus, but especially to the Brown Rat (M. musculus) and the Black Rat (M. rattus). Like the mice, which are included in the same genus, rats are agile and graceful animals, useful in burrowing, predominantly nocturnal. The bright eyes, large ears, naked muzzle, soft fur, and long scaly tail are familiar external characteristics. The brown or Norway rat measures about eight inches in length, not including the tail, which is usually shorter than the body. It is grayish-brown in colour, with flesh-coloured ears, feet, and tail. Black varieties sometimes occur. It is believed to have travelled gradually westwards, perhaps from China, and did not reach France or Britain till towards the middle of the last century. In 1727 it spread from Rouen to the Volga, and rapidly spread over Europe, dispossessing the black rat which had arrived some centuries before. According to some, the black rat was brought to Britain in 1732 in ships from the East Indies. As a common stowaway in ships, it has been distributed over the world, reaching America about 1775. The black rat is smaller and slimmer than the brown rat. The head and body measure six or seven inches in length; the tail is an inch or two longer. The head is more slender than in the brown rat, and the ears are rather larger. In most the colour is glossy black, but white and piebald varieties may occur. It is less fierce than the brown rat, and seems to be less distinctively a burrowing rodent, preferring the upper parts of houses to the cellars. Its original home seems to
have been in the East, perhaps in Persia, but it must have reached northern Europe by the 13th century at least, for its troublesome presence is noticed by Albertus Magnus.

These species of rat have similar habits, and the stronger, larger, and fiercer form sometimes tends to exterminate the other, this being one of the few instances which Darwin gives of his conclusion that the struggle for existence is keenest between closely allied species. As to the habits of rats, it is well known that they find their way everywhere; no door is shut to them; they gnaw and burrow through almost all obstacles. They run and leap, they climb and swim. They are fond of animal food, but will eat almost anything: corn, fodder, all kinds of human food, eggs, young birds, small mammals, all is their to their mull. In illustration of their voracity it is often related that in a slaughter-house near Paris thirty-five dead horses were picked to the bones in a single night. When pressed by hunger they display much boldness, and their skill in stealing even such unmanageable e.g. Nesokia, of which an East Indian species, the Bandicoot-rat (N. bandicota), may measure over a foot in length; Hapalopus, represented by little jerboa like animals in Australia; Echinosdrich, with one species in Celebes, a rat with a very long muzzle, and spines among the fur; Cricetomyx, represented by a formidable African species (C. gambianus) of large size and ferocious voracity. To some more remotely related rodents the term rat is often popularly applied—e.g. to the Water-vole (Arvicola amphibius; see VOLE), and to the American Musk-rat (Fiber zibethicus). See MOUSE, RODENTIA.

Similarly, the Black Rat (Mus rattus); Brown Rat (Mus decumanus).

goods as eggs is well known. Their senses, especially of smell and hearing, are acute, and their intelligence is well developed. The mothers are careful of their tender offspring, but the males display the reverse of parental affection. The albinos are delightful pets. Brewer cites several strange observations in regard to the so-called 'rat-kings,' which consist apparently of a number of diseased rats with entangled tails. It is said that over two dozen individuals have been found thus entangled. Rats are very prolific, breeding four or five times a year. Four to ten young are brought forth at a birth, after a very short gestation of about three weeks. Moreover, the young become sexually mature in about six months. All the conditions favour rapid increase, and plagues of rats by no means easy to cope with not frequently occur. Rats do much damage in various ways—by their burrows, by their voracious gnawing of all sorts of things, by their omnivorous appetite. They undermine walls, destroy woodwork, devour stores. When pressed with hunger they may attack large mammals, and even man himself sometimes falls a victim. They have been known to eat holes in fat pigs, to gnaw off the legs of birds, and even to destroy the soles of elephants' feet. Their destruction may in many cases be left to their natural enemies—birds of prey and carnivorous mammals—but it is often necessary to resort to the use of traps and poisons. One of the most effective ways of destroying them is to feed them with a mixture of meal and plaster of Paris. Their skin is sometimes used for making glove-leather; and their flesh, according to The Farmer's Friends and Foes, by Theodore Wood (1887), is, if similarly cooked, superior to rabbit.

There are several genera nearly related to Mus—

The Cape Ratel (Mellivora rotel).

Africa, and is said to feed much on bees and their honey, its thick fur protecting it against their stings; the other inhabits the north of India, prows about by night, is a voracious devourer of animal food, and often scratches up recently interred bodies from their graves. The Cape ratel is about the size of a badger, gray above, black below. It is easily tamed, and is amusingly active in confinement, continually running about its cage, and tumbling strange somersaults to attract the attention of spectators, from which it seems to derive great pleasure.
RATIONALISM

Rath, the Irish name for a prehistoric hill-fort. See HILL-FORTS.

Rathenow, a town of Prussia, on the right bank of the Havel (here crossed by a stone bridge), 48 miles by rail, and 29 by N. of Berlin. Optical glass, cut stones, woven wares, machin ery, bricks and tiles are made. Pop. (1885) 13,072; (1895) 18,418.

Rathkeale, a town of Ireland, on the river Deel, 19 miles SW. of Limerick by rail. Pop. 2549.

Rathlin, a crescent-shaped island off the coast of Antrim, 6½ miles N. of Ballycastle. Measuring 6½ by 1½ miles, and 3399 acres in area, it has fine cliffs, consists of columnar basalt and limestone, and offers notable points for sea-fishing. The volcanic soil in the valleys is fertile, but fishing is the leading industry, the kelp-manufacture being quite extinct. Rathlin is identified with the Rinia of Poltemy, Rinvia of Pliny, and Raghnin or Ragharin ("fortress of Ireland") of later writers. St. Columba established a church here in the 6th century; and Bruce in 1306 took refuge in a castle, now a ruin. Pop. (1841) 1039; (1891) 365.

Rathitor, a town of Prussian Silesia, stands on the left bank of the Oder, 44 miles SSE. of Oppeln. It is the chief town of the principality of Rathitor, which, a sovereign duchy from 1298 to 1532, has since 1713 been a part of the kingdom of Prussia. The town manufactures tobacco, shoes, paper, glass, sugar, furniture, &c., and has large ironworks. Pop. (1875) 17,269; (1890) 20,578.

Ratich, WOLFGANG (sometimes called RATKE or LATICHUS), educationist, was born at Holstein in 1571, based a new system of education on Bacon's philosophy, which he expounded to the German princes at Frankfort in 1612, and had an opportunity of putting into practice at Köthen in 1618, by favour of the prince of Anhalt. His principle was the realistic one of proceeding from things to names, and from the mother-tongue to the study of foreign ones. But he got into bad relations with the clergy and with his patron, and was actually imprisoned for eight months. A second chance given him at Magdeburg in 1620 ended also in failure, and after some years of indifferent wandering he died at Erfurt in 1635.

There are monographs on him by Krause (1872), Störl (1850), and H. Quens, Essays on Educational Reformers (1865; new ed. 1890).

Ratio. See PROPORTION, FLUXIONS.

Ration, in the British Army, is the allowance of provisions granted to each officer on service and in some colonies, and to each non-commissioned officer and soldier at all times unless on furlough or otherwise specially provided for. The ordinary ration is ½ lb. of meat, with 1 lb. of bread ("best seconds"), increased by ½ lb. of meat when in camp or abroad. Sometimes a grocery ration (tea or coffee, sugar, salt, &c.) is also issued, 1½ lb. being then deducted from the pay of the recipient. When men are not supplied with bread and meat rations an allowance of 6d. per diem is granted them. The bread ration may be increased during operations in the field, though not above 1½ lb. of bread or 1 lb. of biscuit, and the officer commanding may direct the issue in addition of wine, spirits, or any other article of subsistence equivalent thereto. The families of soldiers accompanying them abroad are allowed the following: the wife (married under regulations), half a ration; each legitimate child under fourteen, quarter ration. A ration of forage at home consists of 10 lb. of oats, 12 lb. of hay, 1 lb. of sweep (1 lb. of straw, 1 lb. of hay, and 2 lb. of oats is allowed in camp. Staff-officers and mounted officers of infantry provide their own forage except on active service, and are granted a pecuniary allowance of about 1s. 7d. (varying with the locality) per day to enable them to do so.

The full navy ration consists of the following articles: Daily—1½ lb. of ship-biscuit or 1 lb. of soft bread, ½ pint of spirit, 2 oz. sugar, 1 oz. chocolate, ½ oz. tea; 1 lb. fresh meat and ½ lb. of fresh vegetables, when these are procurable; otherwise, 1 lb. salt pork, or ½ pint split peas, or 1 lb. of sausages, with ½ pint of currants or raisins. On alternate salt-beef days—2 oz. preserved potatoes. Weekly—½ pint oatmeal, ½ oz. mustard, ½ oz. pepper, ½ pint vinegar. The sailor’s ration is issued free of any stoppage.

Rationalism, as a system of belief regulated by reason, might be expected to mean the opposite of irrationalism, but to cause belief into ignorance, and per impossimus, prejudice; and the growth of rationalism would then mean the progress of civilisation, the development of the intellectual and moral nature of men and nations. It is nearly in this sense that Lecky uses the word; attributing to its wholesome influence the decay of the belief in magic, witchcraft, and other hideous superstitions, and the substitution of a kindly tolerance in place of blind zeal for persecution.

But in ordinary English usage, general as well as theological, the connotation of the word is absence of religious belief. Lecky, therefore, used it as a term of reproach for those who, without utterly denying or attempting to overthrow the foundations of religion, make such concessions to the enemy as tend to subvert the faith; who admit the thin end of a wedge that pressed home will rend and destroy the fabric. They are relatively, mor passively, or blame worthily, on mere human reason instead of simply, frankly, and fully accepting the dicta of the divine word. An atheist would not be spoken of as a rationalist, nor would an irreligious, blaspheming freethinker. Rationalism is, in one or another of its features, nothing more than the main body of the orthodox; in especial those who think the 'law' view of inspiration, and minimise or explain away the miraculous details of the history of revelation and redemption. Rationalism is not so much a body of doctrine as a mood of mind, a tendency of thought shown in the attempt to apply to religious doctrine, the sacred story, and the sacred scriptures the same methods of research and proof as are used in mere human science and history, and the literatures of all times and peoples. This feature can be recognized, though with approval, by Lecky in his wider use of the word: 'Rationalism,' he says, 'leads men on all occasions to subordinate dogmatic theology to the dictates of reason and conscience. . . . It predisposes men in history to attribute all kinds of phenomena to natural rather than to miraculous causes; in theology to esteem succeeding religious systems the expression of the wants and aspirations of that religious sentiment which is implanted in man; and in ethics to regard as duties only those which conscience reveals to be such.' Rationalism, not being a system but a censor or drift of mind, has different aims at different times; just as 'liberalism' in politics was not the same thing before 1832 as it came to be after, or in 1832 what it was in 1867, 1885, or 1890. Opinions are held in serious and sober men by theological professors in 1891 without proving serious stumbling-blocks to the majority, which in 1860 would by all but a small minority have been regarded as distinctly rationalistic. Thus, till lately it was alarming rationalism to dispute the Mosaic authorship of Genesis, the Solomonic authorship of the Song of Songs, and the Davidic authorship of any of the Psalms; now the newer view is as many orthodox teachers. And in the last quarter of the 19th century scholars earnestly
support views which they themselves treated as highly dangerous twenty or thirty years earlier. Rationalism of this kind is a transition stage, but not necessarily a transition to unbelief.

The idea has been, and perhaps may be, traced in almost every age of the church’s history: no doubt the extreme representatives of the Petrine party in sub-apostolic times regarded Paul’s views as lax and rationalistic. If the Reformation was not rooted in rationalism (as to Catholics it seems to have been), many of the contentions of the reformers were such as all rationalists accept and sympathise with. Zwingli was a rationalist to Luther and the Lutherans; Socinus was of course a rationalist of an extreme type. The dry and language-neutralism, was the in the late 17th and 18th centuries fostered a rationalism as cold and un-spiritual. In the England of the 18th century, during the Deistic controversies, the Evangelicals of Germany thought, not altogether unjustly, that some of the most conspicuous opponents of the deists were not themselves free from the charge of rationalism; and the Evangelicals of Scotland regarded the ‘moderates’ of the 18th century, however orthodox in dogma, as thoroughly rationalistic in spirit. Rationalism is not so much opposed to orthodoxy as to mysticism, and what was called variously rationalism, enthusiasm, ‘lighting,’ and methodism. A soulless orthodoxy has not seldom been opposed by a fervent piety that by a not unnatural antithesis has tended to run into heretical extremes; while, on the other hand, actual rationalists have often been foremost amongst the champions of orthodoxy, and of revealed religion, against radical freethinking, deism, naturalism, and materialism.

In Germany the term rationalism is more definite in its reference than in England, but is not always used in quite the same sense. The two defective and mutually opposed schools of thought that Kant sought to supersede by his critical philosophy were, on the one hand, a shallow empiricism, and on the other a baseless and overweening metaphysical dogmatism or rationalism. Bacon also contrasted empirical philosophers with rationalists who spin theories out of their own bowels. Wolff presents the most conspicuous example of the philosophical rationalism which held that all is in heaven above and earth beneath could be ‘proved’ by pseudo-mathematical methods: and as God, responsibility, and immortality cannot be ‘proved,’ the whole of the doctrine of revealed religion. What in revelation could not be demonstrated according to this scheme was disallowed or explained away. Practical religion became in the Aufklärung a system of mere utilitarian morals.

It was paraphrased in a deeper view of man, history, and the universe; but his own explicit statements on positive religion were pronouncedly rationalistic: and the negative side of his philosophy was well calculated to lay the foundations of another school of theological rationalists (often called Deism), whose champions are Diderot, Voltaire (1759–1837), Breitknecht (1776–1844), and Wegscheider (1771–1849) may be taken as representatives.

De Wette (1780–1849) shows the transition to Schleiermacher, who (though in the English sense of the word he was an orthodox rationalist) converted the school of theologians and supernaturalists, founded a higher and truer religious philosophy, and heralded even the ‘piscopal theology’ of the mediation school.

But it was not in the sphere of speculation and dogma, but in that of biblical criticism, that German rationalism accomplished its main work, and that it left its deepest mark on the new theological development. In the early 18th century the ‘Germans in Greece’ were ready to seek, as English scholars thought: the Germans themselves admitted that in studying the Scriptures they failed to escape from dogmatic presuppositions, and that it was the English divines who approached the New Testament in a historical spirit, which in the Germany of that day caused misgivings. It is noteworthy that Semler (1725–91), ‘the father of rationalism,’ obtained the doctorate for a thesis written against Whistton, Bentley, andsemi-Rationalists, was that it was a laughing-stock. Strauss’s ‘mythical theory’ (excessively rationalist in the English sense of the term) was in its turn superseded by Baun (q.v.) and the new Tubingen school, whose epoch-making work marks the opening of the most recent period in scripture criticism. In the new criticism the rationalism of the older English point of view, the conviction that all truth is one, whether derived from the natural sciences, historical research, the dictates of conscience, or the records of divine revelation, and the willingness to accept what is apparently an unscientific spirit than the assumptions of a reckless sciolism: there is a false and a true rationalism; and it should be remembered that much that is now most surely believed by all has at one time or another been branded as rationalistic.

See the church histories; Tholuck, Vorlesungen über die Rationalismus und Geistesgeschichte des Aristotelismus (1865, unfinished), and earlier monographs by Staudlin and Rückert; H. J. Rose’s essay On the State of Religion in Protestant Germany (1825); and the Principles Inquiry into the Causes of the Rationalist Character of the Theology of Germany (1828–30); A. S. Farrar, Critical History of Free Thought (1862); R. W. Mackay, The Tubingen School and its Antecedents (1863); Locke, History of the Rationalists in Europe (1866); and the History of Rationalism (New York, 1866); Fisher, Faith and Rationalism (New York, 1879); Trollope’s Rational Theology (1872) and Movements of Religious Thought (1885); Draper, Intellectual Development of Europe (1877), and Conflict between Science and Religion (1874); Cairns, Unbelief in the Eighteenth Century (1881); Pfieler, The Development of Theology in Germany since Kant (1889).[1][2] The articles Rationalism, History, Reformation, Eirenism, Exegetics, and works there cited, with the articles on the chief rationalist critics and thinkers.

Ratisbon (Ger. REGensburg), a town of Bavaria, stands on the right bank of the Danube, 82 miles by rail NNE. of Munich. Formerly a town in the city of the empire and seat of the Diet, Ratisbon preserves its ancient marks, with narrow crooked streets, and high, many-corned, gabled houses. Among its churches the most
remarkable is the noble Gothic cathedral, begun in 1275, but not completed till 1534, and restored in the 19th century. The Church of St. James, formerly belonging to the Irish (Scoti) Benedictines, dates from the 12th century, and is built in the pure Byzantine style. The old town-hall was used for a century and a half (1645-1806) as the place of meeting for the imperial diet. At the Great Council, 1780, a motion was made by his son John of Austria. There are numerous interesting private dwellings, as the Thur and Taxis Palace, with library (40,000 vols.), picture-gallery, &c., the royal villa, and others. A stone bridge (1135-46), 1624 feet long, connects Ratibish with the island of Stadlin am Hof. The manufactures include porcelain and stoneware, brass and steel wares, leather, tobacco, lead-pencils, chemicals, &c.; and there is an active trade, especially in corn and salt. Pop. (1875) 31,487; (1890) 37,365. Originally a Celtic town, Radabanze (whence Ratibish), this place was made by the Romans a frontier fortress. Later it was the capital of the Duchies of Bavaria. Frederick II. declared it (1245) a free imperial city. During the 14th century it was the chief seat of the Indo- Levantine trade, and was one of the most populous cities of southern Germany. Here were signed the Ratisbon Interim (q.v.) in 1514 and the armistice between France and Austria in 1804. The city was stormed by Duke Bernard of Weimar in 1833, and by both the Austrians and the French in 1859 and led to Ratibish in 1881. See works by Weininger (7th ed. 1884) and Janner (3 vols. 1883-86).

Ratnagiri, a coast-town of India, 136 miles S. by E. of Bombay, with a port and sardine-fishery. Pop. 12,616. — The district has an area of 3922 sq. m. and a pop. (1891) of 1,105,926.

Rattan, a walking-stick made from the stem of a palm that is found in Sumatra. See PALM, p. 722.

Rattany. See RHATANY.

Rattazzi, Ubrano, an Italian statesman, was born at Alessandria, June 29, 1808. He studied law at Turin and practised as an advocate with great success at Casale. After the proclamation of the constitution in 1848 he was elected member of the Senate for Alessandria, and began his political career as a democrat. His eloquence and liberal principles raised him to the ministry; Gioberti made him minister of the Interior and later of Justice; but after the defeat of Novara he was obliged to retire along with the rest of the ministry. When Napoleon III. threatened the liberty of Piedmont, Cavour, Rattazzi, and their parties joined together to defeat his schemes, and in 1853 Rattazzi took the portfolio of Justice under Cavour, and presented the bill for the abolition of convents. Being accused of weakness in suppressing the Mazzinian movement in 1857, he retired from office early in the following year. In 1859, however, he was back again in office as minister of the Interior. The threatened secession of Savoy and Nice, which he opposed, led to his retirement in 1860. Having changed his views on this point, he was in March 1862entrusted with the formation of a new ministry, but had to resign at the end of the year in consequence of his opposition to Garibaldi; and once more prime-minister for six months in 1867, he lost the post for the same reason. He died at Frosinone, June 5, 1873. A want of sincerity was his chief drawback as a statesman.

His Speeches were edited by Scovazzi (8 vols. Rome, 1876-80). See A Life by Morelli (Padua, 1874), and Rattazzi et son Temps (Paris, 1881).

Rattlesnake (Crotalus), a genus of highly specialised venomous snakes, with a rattle of horny rings at the end of the tail. A long fang is borne on each maxilla, and is performed by a canal, down which the venomous secretion of a modified salivary gland flows when the rattle strikes. Behind each fang are several reserve fangs, which replace it after breakage — a not unfrequent result of the bite. There are about fifteen species, exclusively American. Of these the Banded Rattlesnake (C. horridus) is abundantly distributed from Maine to Arizona, C. molossus (Mexico and Arizona), C. lueher (California and other western regions), the Diamond Rattler — C. aduananteus (California and Mexico), the Horned Rattler — C. cerastes (California, Arizona, and Mexico).

Rattlesnakes are naturally sluggish and prefer defensive to offensive tactics, except when on the track of their natural prey — rabbits, rats, squirrels, and other small mammals. Not a few ideas about rattlesnakes must be dismissed as false: they do not fascinate or charm mammals or birds, though these may be overcome by an almost paralyzing fear; the rattling does not lure prey nor attract mates, but is rather a reflex expression of excitement, apparently warning off molesters on whom the snake is doubtless unwilling to expend energy in the exhausting act of striking; finally, the number of rings does not necessarily indicate the age of the animal, though new rings seem to be added at successive sloughings. Rattlesnakes are generally nocturnal. The young are brought forth alive. The poison is very deadly, rapidly paralysing the nerve-centres and affecting the respiratory and circulatory functions. When a man is bitten it is customary to ligature above the wound, to suck out the poison, to use stimulants freely, and to inject antidotes such as permanganate of potash. Often, however, the result of the bite is fatal (see SNAKES).

Rattray, a police brough of Perthshire, on the Erich, opposite Blairgowrie. Pop. 2227.

Rauch, Christian Daniel, sculptor, was born at Aroden, in Waldeck, 21st January 1777. In 1797 he became valet to Frederick-William III., king of Prussia, but, resolving to devote himself to art, was enabled by the generosity of a nobleman to study at Rome, where he enjoyed the friendship of Thorwaldsen, Canova, and Wilhelmine von Humboldt, the Prussian minister. In 1811 he was called by the king of Prussia to Berlin to execute the monumental statue of Queen Louisa now at Charlottenburg. Rauch was not, however, quite satisfied with this triumph of his art, but commenced a new statue of the queen, which he finished eleven years afterwards, a masterpiece of sculpture, now in the palace of Sans Souci. After this he lived principally at Berlin, but occasionally visited Rome, Carrara, and Munich. He laboured indefatigably
in his profession, and by 1824 had executed seventy busts in marble, of which twenty were of colossal size. His works include two colossal bronze statues of Field-marshal Blücher (1827), a horseman, by Johann Heinrich Wieber (1808-81) at Horn, near Hamburg, in connection with the German Home Mission (Internere Mission). It is partly a refuge for morally neglectable children; partly a boarding-school for the moral and intellectual education of children of the higher classes; lastly, a training-school for those who wish to become teachers or officials in houses of correction, hospitals, &c., in promotion of the objects of the Home Mission. It was opened on November 1, 1831, by Wieber with twelve neglected children. By the addition of new houses the whole has, however, become very much enlarged, and has of late almost grown into a colony. A printing-office, a bookbinders' shop, and book-selling form part of the institution. The children live in families of twelve, each family being under the paternal superintendence of a young artisan, who employs the children according to their capabilities, partly in indoor, partly in outdoor manual labour. In connection with the Raueh Haus there has been founded in 1845 a kind of conventual institute for the education of young men as heads or superintendents of similar institutions. See works on the subject by Wieber (1835-39).

Rauh's Haus ("the Rough House," so called) is the name of a great institution founded and managed by Johann Heinrich Wieber (1808-81) at Horn, near Hamburg, in connection with the German Home Mission (Internere Mission). It is partly a refuge for morally neglectable children; partly a boarding-school for the moral and intellectual education of children of the higher classes; lastly, a training-school for those who wish to become teachers or officials in houses of correction, hospitals, &c., in promotion of the objects of the Home Mission. It was opened on November 1, 1831, by Wieber with twelve neglected children. By the addition of new houses the whole has, however, become very much enlarged, and has of late almost grown into a colony. A printing-office, a bookbinders' shop, and book-selling form part of the institution. The children live in families of twelve, each family being under the paternal superintendence of a young artisan, who employs the children according to their capabilities, partly in indoor, partly in outdoor manual labour. In connection with the Raueh Haus there has been founded in 1845 a kind of conventual institute for the education of young men as heads or superintendents of similar institutions. See works on the subject by Wieber (1835-39).

Rauh, Friedrich Ludwig Georg von, German historian, was born at Wörlitz, near Dessau, in the duchy of Anhalt, on 14th May 1781, studied law at Halle and Göttingen, and entered the Prussian state service in 1801. In 1811 he accepted the chair of History and Politics at Breslau; in 1819 he was called to fill the similar chair at Berlin. He was for some time secretary of the Berlin Academy. In 1848 he was sent to Paris as ambassador of the German parliament. He died on 14th June 1873. The first scientific historian to popularise history in German, Von Raueh was the author of "Geschichte der deutschen Staaten bis auf die Gegenwart" (24 vols. 1825-35), his best book, based on critical research, and agreeably written; "Geschichte Europas seit dem Ende des 15. Jahrhunderts" (8 vols. 1832-50); "Beiträge zur neueren Geschichte" (5 vols. 1836-39); and edited the useful "Historisches Taschenbuch" from 1830. In the years 1830-43 he made extensive journeys, going as far as the United States; the observations made during these trips were written in several books dealing with England (1830 and 1841), Italy (1840), the United States (1845), &c. See his Lebenserinnerungen und Briefe (2 vols. 1861).

Rauer, Karl Georg von, geologist and geographer, a brother of the preceding, was born April 9, 1783, at Wörlitz, studied at Göttingen and Halle, and at the Mining Academy at Freiberg, was appointed professor of Mineralogy at Breslau in 1811, was translated in 1819 to Halle, and finally, in 1827, was appointed professor of Mineralogy and Natural History at Erlangen, where he died June 2, 1865. His most ambitious book was "Geschichte der Pudagogik" (1843-51; 5th ed. 1878-80), a portion of which was issued separately as "Die Erziehung der Mädchen" (4th ed. 1886). His most popular books were: "Handbuch der Erdbeobachtung" (6th ed. 1866); "Palästina" (4th ed. 1860); and "Lehrbuch der allgemeinen Geographie" (1852; 3d ed. 1848). He also wrote books more immediately connected with his special study, as "Geognostische Fragmente" (1811), "Versuch eines ABC-Buchs der Kristallkunde" (1820-21), &c. See his Autobiographie (1825).—His son, Rudolf von Raueh (1815-76), from 1846 a professor at Erlangen, won a high reputation in the field of Teutonic philology.

Ravalliac, François (1578-1610), a bankrupt schoolmaster, who, after long imprisonment and a brief service in the Order of Fontaines, was moved by fanaticism to stab Henry IV. (q.v.) of France. He was torn asunder by horses. See Loiselier, "Ravalliac et ses Complices" (1873).

Ravelin. See Fortification.

Raven (Corvus cornix), a species of Crow (q.v.), now somewhat rare in Britain except in remote regions or on rocky islands. It is, however, widely distributed in Europe, northern Asia, and North America. The plumage is glossy black, with a purplish-blue lustre on some parts. The bill and legs are also black. In length the raven measures about two feet. The males are rather larger and more lustrous than the females. Very early in the year the bulky nest is built on a cliff or tree; the three to five eggs are blueish-green, with brownish spots. The raven's note tends to be harsh, but is refined at the pairing season, and the bird may be trained to parrot-like imitation with remarkable success. The flight is powerful, and the bird often soars high. On small mammals, such as rats, the raven is fond of feeding, and its attacks on game and even lambs have led to its extermination in many districts. In Scandinavia the raven was sacred to Odin, but in many countries it is a bird of ill omen. Instances are on record of ravens which lived for four-score years, and there is no doubt that its natural longevity is great. Three varieties or subspecies of the raven are recognised in North America. See Crow; and R. W. Schmudt, "The Mythology of the Raven" (1890).

Ravenna, a city of Italy, 43 miles E. of Bologna, once close to, but now some 5 miles from the Adriatic, with which it is connected by the Consini Canal, is enclosed by a wall 3 miles long, with five gates. It has been the seat of an archbishop since 438, and possesses a museum, a public library, a picture-gallery, municipal buildings (with a leaning tower), a theatre, &c. It has manufactures of silk, linen, paper, and glass, and a trade in wine and agricultural products. The streets are wide, and the squares are adorned with statues of the popes. The outward aspect of the
town and its buildings is dull and disappointing, but the interiors of the churches are exceedingly interesting. Pop. 12,100; of commune, 60,573.

Possibly a Thessalian settlement, afterwards held by the Umbrians, Ravenna passed to Rome as one of the cities of Cisalpine Gaul south of the Po. It first became famous under Augustus as the site of the famous Roman baths. The Classical flowering suburb—as its port, a site marked now only by a church, and separated from the sea by the pine forest celebrated by Dante, Boccaccio, Dryden, and Byron. Deserted by the sea, and strongly entrenched by canals and marshes, Ravenna became the refuge of the Emperor Honorius (402), and the capital of Italy for the next 350 years. Imperial until Romanus Augustulus dethroned the purple at the bidding of Odovacar (see ITALY), who ruled at Ravenna 476–493, it attained its greatest glory under Theodoric the Ostrogoth (493–526), and afterwards by the Franks, by whom it was gifted to the pope. It was the religious and early part of the 13th century, governed by its own dukes in the 14th, subject to Venice after 1440, it was won by Pope Julius II in 1509, and continued papal until it became national in 1860.

Ravenna, which on account of its numerous ancient churches, holds a unique position as 'the Pompeii of the 5th and 6th centuries'—that marked transitional period in early medieval history. There are at least six churches of the time of Galla Placidia (350–450), the sister of Honorius and nun. After the death of her husband, III Vizala, her brother, is her mausoleum, and there lie her brother, her second husband Constantius III, and her son, Theodoric, leaving, with rare religious toleration, the cathedral of St Urso (almost entirely rebuilt, 1754) and the other churches to the Catholics, erected for his Abu in whose mausoleum (La Martin) (now St Apollinare Nuovo, with its marvelous mosaic processions of martyrs added about 500, when it was 'reconciled') as a cathedral, a baptistery (now St Maria in Cosmedin), and St Teodor (now St Spirito). St Vitale (with contemporary portraits in mosaic of the emperor and Theodoric)—the model for Charlemagne's cathedral at Aix-la-Chapelle—and the magnificent basilica of St Apollinare in Classe belong to the age of Justinian. The round campaniles, perhaps of the 10th century, form another architectural feature peculiar to Ravenna.

Dante died at Ravenna, September 14, 1291, and is buried there. A column, 2 miles from the walls, commemorates the fall of Gaston de Foix at the head of the French army of Louis XII., after a bloody and useless victory over the papal and Spanish troops, April 11, 1512. Byron revisited at Ravenna from June 1819 to October 1821.

**Ravensburg.** A town of Württemberg, 11 miles by rail NE. of Friedrichshafen, on Lake Constance. Pop. (1890) 12,287.

**Raveseoff, Thomas** (1592–1640), musical composer and author of Metempsichta (1611), and of a collection of songs with four voices, The Whole Book of Psalms (1621) by which he is famous. Some of the tunes, such as St David's, Canterbury, Bangor, and many others, which have since become popular, are by Ravenesoff himself.

**Ravenspur.** See Humber.

**Ravignan, Gustave François Xavier Delacroix de,** a celebrated Jesuit preacher, was born at Bayonne, December 2, 1736, was professor at Montmoreau, and became famous in 1837 as preacher at Notre-Dame in Paris. He died 20th February 1858. He published an Apology of his order in 1844, and in 1854 a more lengthened work with the same view, Clement XIII. et Clement XIV. See memoirs by Ponjoulot (1858) and De Ponleroy (1860; Eng. trans. New York, 1873).

**Ravindra.** See Traveller's Tree.

**Rawal Pindi,** a town and important military station of the Punjab, lies between the rivers Indus and Jhelum, 160 miles by rail NW. of Lahore. It became the principal city of the Punjab in 1844, and since the last Afghan war, the town has increased at a rapid rate. Pop. (1868) 28,586; (1881) 59,980; (1891) 73,460. There are an arsenal (1883), a fort, a fine public park, several European churches, including the garrison church, in which Bishop Maxwell (1865–1885) was rector. Rawalpindi (1883), a fort, a fine public park, several European churches, including the garrison church, in which Bishop Maxwell (1865–1885) was rector. Rawalpindi has an area of 15,435 sq. m. and a pop. of 2,150,568.

**Rawitsch,** a town of Prussia, 64 miles by rail S. of Pozen. Pop. 12,919.

**Rawlinson, Sir Henry Creswicke,** Bart., orientalist and diplomatist, was born at Chaldon- ton in Oxonshire, 11th April 1810, and entered the East India Company's army in 1827. In 1833 he proceeded to Persia to assist in organising the Persian army. During the 1840's he was in India. In that country he began to study the cuneiform inscriptions, and made a translation of Darius' famous Medes and Persians inscription, which he published in the Journal of the Royal Asiatic Society. After he left Persia he held command of Kandahar during the troubles times of 1840–42 (see Afghanistan); he was appointed political agent at Bagdad in 1844, and consul-general there in 1851. He showed great bravery in the field, and remarkable skill and resource in diplomacy. In 1855, now made K.C.B., he was appointed political agent in Persia. He died at Shire in 1858, and was buried at Kandahar. In 1858–59 he was again in Persia as British minister; and was successively member (1868) and vice-president (1876) of the Council of India. In 1865–68 he sat in parliament for Frome. He held the presidency of the Royal Geographical Society (1871), to which he contributed valuable papers, a trusteeship of the British Museum (1870), and a directorship of the Royal Asiatic Society. He was made a baronet in 1891; and he died 6th March 1895. The 'father of Assyriology,' he wrote A Commentary on the Cuneiform Inscriptions of Babylonia and Assyria (1857), The History of Assyria (1822), The Cuneiform Inscriptions of Western Asia (with Norris and George Smith, 5 vols. 1861–70), and England and Russia (2d ed. 1875). See the Life by his brother (1868).

That brother, REV. GEORGE RAWLINSON, orientalist and historian, was born at Chaldonhinton in Oxonshire in 1812, took a first-class in classics from Trinity College, Oxford, in 1838, and was elected a Fellow of Exeter College in 1840. In 1839 he preached as Hampton Lecturer on Historical Evidence of the Truth of the Scripture Records, and two years later was chosen Camden professor of Ancient History. In 1872 he was made a canon of Canterbury. His historical publications cover nearly the entire history of the ancient Orient. The series opens with the standard edition of Herodotus (4 vols. 1838–60; 6d ed. 1876), which was
followed by The Five Great Monarchies of the Ancient Eastern World (4 vols. 1862-67), The Sixth Great Oriental Monarchy of Parthia (1874), The Seventh Eastern Monarchy: History of Ancient Egypt (1881), and History of Phenicia (1889). The same ground is also covered in part in the smaller popular works, Egypt and Babylon from Scripture and Profane Sources (1884), Manual of Ancient History (1883), Religions of the Ancient World (1882), etc. In addition to these, he has written several volumes of biblical exposition and religious criticism, as Contrasts of Christianity with the Hebrew and Jewish Systems (1861), a series of sermons preached before the university of Oxford; Esther, Ezra, Nehemiah, &c., for The Speaker's Corner with an appendix (1881 and 1885); Moses, His Life and Times (1887); Kings of Israel and Judah (1889); Isaac and Jacob (1890); brief essays contributed to Present Day Tracts; and the article PHENICIA in the present work.

Rawmarsh, a town in the West Riding of Yorkshire, 2 1/2 miles N. of E. of Rotherham, with china and iron works, and neighbouring collieries. Pop. 2,171 (1881), 2,188 (1890).

Ray, a popular name applied to many of the flat cartilaginous fishes or Elasmobranchs. Skate (Raja batis), Thornbacked (R. clavata), Electric Rays (Torpedo), Sting-rays (e.g. Trygon), Eagle-rays (e.g. Myliobatis) are representative. They lead a somewhat sedentary life at the bottom of the sea, moving sluggishly by undulations of the pectoral fins which form a large part of the flat body. They are all carnivorous. The true rays, of which skate and thornback are typical and very common species, form the family Rajidae. Many attain a large size, sometimes measuring six feet across. The flesh is flavoured and strongly esteemed. See CARTILAGINOUS FISHES, DEVIL-FISH, ELECTRIC FISHES, SKATE.

Ray, or Wray, JOHN, naturalist, was born at Black-Notley, near Braintree, in Essex, 29th November 1628. From Braintree free-school he went up to Cambridge, where he was fellow, Greek lecturer, mathematical tutor, and junior deane in Trinity College, but after a time began to devote himself entirely to the study of natural history. At the Restoration he accepted Episcopal ordination, but was ejected by the 'Black Bartholomew' (1662). Thereupon, accompanied by a kindred spirit, Francis Willughby, a friend and former pupil of his own, Ray travelled over most of the United Kingdom, collecting and investigating botanical and zoological specimens; and in 1663 they started on a tour through the Low Countries, Germany, Italy, and France, with a similar object, Willughby taking the zoology under his charge, and Ray the botany. In 1667 Ray was elected a Fellow of the Royal Society, to whose Transactions he occasionally contributed valuable papers. In 1672 his friend Willughby died, leaving him guardian to his two sons. After several changes of residence, in 1679 Ray settled down in his native village, where he died, 17th January 1705. As a botanist and zoologist he ranks very high, the classification of plants which he proposed being practically in the main the foundation of what is now known as the 'Natural System' of classification (see BOTANY). Ray's zoological work is considered by Cuvier as the foundation of modern zoology. The chief of his works on botany are Methodus Plantarum Nova (1682); Catalogus Plantarum Anglice (1670), the basis of all the subsequent floras of Britain; and Historia Plantarum (3 vols. 1689-1703). His zoological works include the Synopsis Methodicæ Animalium (1693) and three posthumous volumes on Birds, Fishes, and Insects, published by Dr Derham. He was also the author of some theological works. His friend Willughby, having collected the materials for an extensive work on the animal kingdom, left to Ray the task of arranging and classifying them (see WILLUGHBY). See Memorials of Ray (1846), and his Correspondence (1848), both edited by Dr E. Lancaster for the Ray Society, which was founded in 1844.

Rayahs, the Christian peasantry, labourers, and small farmers, who lived under Turkish rule, or rather misuse, in the Balkan peninsula. The word means 'cattle,' and as cattle these people were treated by their Turkish masters in Bosnia, Servia, Bulgaria, and the neighbouring states.

Rayleigh, LORD, physicist. John-William Strutt, third Baron Rayleigh, was born 12th November 1812, studied at Trinity College, Cambridge, and was the senior wrangler (1835), Smith's prizeman, and fellow of his college (1866). He was professor of Experimental Physics at Cambridge from 1879 to 1884; in 1888 succeeded Tyndall as professor of Natural Philosophy at the Royal Institution; and is D.C.L., LL.D., and F.R.S. He has contributed much to the scientific periodicals, edited Clerk-Maxwell's Heat, and is author of The Theory of Sound (1877–78). In 1894, with Professor Ramsay, he separated from atmospheric nitrogen the new gas argon—bitherto undetected, but constituting about 1 per cent. of the atmosphere.

Rayonard, FRANÇOIS JUSTE MARIE, poet and philologist, was born at Brignolles, 18th September 1761, studied at Aix, and in 1791, an advocate and a deputy, joined the Girondins, and was for a time imprisoned. His poems and tragedies were successful, and in 1807 he was elected to the Academy, of which he became perpetual secretary in 1817. A member of the imperial legislative body from 1806, he continued to produce dramas, but towards the fall of the Empire turned his attention to linguistic and particularly Provençal studies. His researches into the origin and transformations of this tongue led to many valuable discoveries, though his theories as to the relation of the language of the troubadours to the other Romance tongues are not now accepted. Rayonard died at Passy, near Paris, 27th October 1836.

His chief writings are Éléments de la Grammaire Romane (1816); Choix de Poésies Originales des Troubadours (6 vols. 1816-21); Grammaire comparée des Langues de l'Europe Latine dans leur Rapports avec la Langue des Troubadours (1821); and Lexique Romane, ou Dictionnaire de la Langue des Troubadours (6 vols. 1835-44).

Razor. See BEARD, CUTLERY.

Razor-bill, or RAZOR-BILLED AUK (Alca torda), a species of Auk (q.v.), very common on
the coasts of Britain and of all the northern parts of the Atlantic Ocean. In March and April they congregate in great numbers on cliffs and islands for the breeding season. A single egg, measuring about 3 inches in length, and of a white or light brown colour streaked with dark brown, is laid in a crevice or under a ledge of rock. The male helps to sit on the eggs. The razor-bill measures about 17 inches. The plumage is of a glossy greenish black on the upper parts and dazzling white underneath. It is a handsomer bird than the Guillemot (p. v.), and can be readily distinguished from it at a distance by its upturned tail. The flesh of the razor-bill is used for food, and the eggs are esteemed a delicacy. They are less easily obtained than those of the guillemot, being usually laid in concealed situations.

Razor-fish, or Razor-shell (Solen), a genus of bivalves of which the common British species *S. obliquus* and *S. maura* are familiar examples. The shell is remarkably elongated, and gaps at both ends, the siphons are short, the foot is large and powerful. The species are numerous, and inhabit the sands of all seas except in the coldest parts of the world. Some of the tropical species have shells of great beauty. The solens burrow in sand, making vertical holes 2 or 3 feet in depth, and ascending and descending by means of their foot, which is capable of being contracted to bore a passage for the animal, and to drag it through. They are used for food, and also by fishermen for bait. To obtain them, a hooked iron instrument is used. Another method is to drop a quantity of salt on the mouth of the hole, which causes them to come up, when they are quickly seized.

Ré, Ile de (*Exe insula*), is a small, low-lying island off the coast of the French department of Charente-Inférieure, opposite the city of La Rochelle, from which it is separated by the Pertuis Breton. It is about 18 miles long and 3 broad, measures 28 sq. m., and has about 16,000 inhabitants, who are chiefly engaged in the preparation of salt (32,000 tons annually). The west coast is rocky; on the east side there are some good harbours. Oyster-farming has of late become an important branch of industry (35,000,000 annually). Wine is made, and Bordeaux town, St. Martin (pop. 2789), was fortified by Vauban. Ars and La Flotte have each about 2000 inhabitants.

Reade, Charles, novelist and playwright, was born at Ipsden House on 8th June 1814. The youngest of eleven, he came on both sides of good lineage, his father an Oxfordshire squire, his mother a clever Evangelist, from her he inherited his dramatic instinct. After five years (all haggling) at Illey, and six under two other and milder private tutors, in 1831 he gained a demyship at Magdalen College, Oxford, and in 1833, having taken a second class in honours, was duly elected to a lay readship. Next year he entered at Lincoln's Inn, and in 1834 was called to the bar, meanwhile having made the first of many tours abroad and at home, and developed a craze for trading in violins. 'I studied,' he tells us, 'the great art of Fiction for fifteen years before I presumed to write a line of it;' and it was not till 1850 that he put pen seriously to paper, 'writing first for the stage—about thirteen dramas, which no-thing of a body would take. Through all this, however, he formed his platonic friendship with Mrs Seymour, a warm-hearted actress, who from 1854 till her death in 1879 kept house for him. She animated, counselled, guided him; and, apart from his comedies and sketches (which were many), his life after 1852 is little except a record of the production of plays and novels, by the former of which he generally lost money, by the latter won profit and fame. The plays include *Masks and Faces* (1852), written in conjunction with Tom Taylor, and having Peg Woffington for its leading character; *Gold* (1853), the gorm, and *Sera Nu- quam* (1865), the dramatised form, of *Never too Late; and Drink* (1879), an adaptation of Zola's *L'Assommoir*. Of his eighteen novels may be mentioned *Peg Woffington* (1853); *Christie John- stone* (1854), a very whaven fission hase; *It Is Never too Late to Mend* (1856), a tale of prison abuses and life in Australia; *The Cloister and the Hearth* (1861), his hero Erasmus' father, condemned, like Reade himself, to celibacy; *Hard Cash* (1863), against private lunatic asylums; *Griffith Gaunt, or Jealousy of the Dolphin and Plane* (1865), with Dion Boucicaut, against ship-breaking; *Put Yourself in his Place* (1870), against trades-unions; *A Terrible Temptation* (1871); and *A Woman- kater* (1877), for woman's rights. His last years clouded by sorrow and ill-health, he died at Shep- herd's Bush on Saturday, 11th April 1884, and was buried in Willesden churchyard beside his 'beloved friend.'

Charles Reade was not one of the greatest novelists of the century (who number three, at most four); but of the second order he is perhaps the best. He is sometimes coarse, sometimes very dull, occasionally more than rather than dramatic, and sometimes even dull, weighed down with authorities—the blue-books, books of travel, and the like, with which he fettered his imagination. With the greatest novelists one is conscious only of the story, with him one is conscious with the story; some tone or mannerism from time to time jars upon us. And yet what a story-teller it is. How he carries us with him, stirs us, saddens, gladdens, terrifies, delights. No novels are better than his to read aloud. For they hold the listeners spell- ing in which no other tale of adventure a so stirring and incident so inexhaustible can pretend to
moment's comparison with it—unless we are foolish enough to risk a reference to the many who, without any knowledge, untrained, and even for verse or prose for verse, than does that of Shakespeare's greatest contemporary by the name of Shakespeare.

Charles Reade: A Memoir (2 vols. 1857), by his brother and a nephew, is a most unhappy piece of biograph. The Gentleman's Magazine for 1852 contains two important articles by Sir W. Benett and 'Ouida'; and in his Miscellanea. (1836) is Mr Swinburne's article from the Nineteenth Century. Readmonds (1852) is a collection of the novels fragments and Essays from his work, with an introduction by Mrs Ireland, appeared in 1851.

Reader. See LAY-READER.

Reading. a municipal, parliamentary, and county borough, the capital of Berkshire, on the Kennet, near its influx to the Thames, 36 miles by rail W. of London (by road 39, by river 74). Its strong castle was wholly demolished by Henry II.; and the splendid Benedictine abbey, founded in 1121 by Henry L., who was buried here, is represented by considerable ruins and a fine gateway, restored in 1861, and surrounded by public gardens. Nine parliaments were held within its hall; and the last of its mitred abbots was changed by Henry VIII., and it was part of the church, before the Reformation. There are handsome modern buildings and two excellent town-halls, a lofty clock-tower, a free library, concert-room, museum, &c. Other buildings are the Italian asise courts (1861); a large grammar-school (1486; rebuilt 1870-71), of which Dr Valpy was long head-master; St. Lawrence's Church (1434; restored 1860) and the Royal Berkshire Hospital. University Extension (Oxford) College, opened in 1898, has accommodation for six hundred students; and the largest (59 acres) of three public parks was gifted in 1891 by Mr G. Palmer. Reading is an important industrial centre and agricultur produce, and has manufactures of iron, paper, sauce, &c., whilst two of its industrial establishments are world-famous—Huntley and Palmer's huge biscuit-factory and Sutton's seed-emulsion. Reading, which is in the diocese of Oxford, gives its suffragan bishop. Its representation was reduced from two to one in 1855, when, however, the parliamentary borough was extended. The first charter was granted by Edward III. Pop. (1851) 24,456; (1881) 46,064; (1891) 55,732; county borough (1891) 60,034. Reading suffered much loss by the Danes in 885, and in 1043 surrendered to Essex after a ten-days' siege. It was the birthplace of Archibald Land, Justices Talford, and Goldwin Smith, but not of Miss Edgeworth, who is often claimed as a native. It has memories also of Chaucer and Bunyan.

See works by Coster (1802-9), Man (1816), Doran (1835), and J. J. Jones (1857).

Reading, a city of Pennsylvania, capital of Berks county, on the left bank of the Schuylkill River, 58 miles by rail NW. of Philadelphia. It is pleasantly situated on an ascending plain, and from the neighbouring hills draws its water supply. and abundant iron ore. The principal manufactures of Reading are its iron and steel works. These include many rolling-mills, forges, foundries, furnaces, machine-shops, nail-works, &c. It has also manufactories of shoes, hats, beer, cigars, leather, paper, bricks, &c. Settled in 1748, it became the seat of the diocese in 1819, and is that of an Episcopal bishop. Many of the inhabitants are of German descent, and half the newspapers are in that language. Pop. (1800) 58,601; (1900) 78,961.

Reading, a town of Massachusetts, 12 miles by rail N. by W. of Boston, with boot and shoe and furniture factories. Pop. (1800) 4989.

Reading Beds. See ENGLISH SYSTEM.

Realism. See Induction.


Realty. A silver coin and money of account in Spain, Mexico, and other old Spanish possessions, is the 24th part of the piastre, or 4th of the peseta, the name of the new Spanish decimal system, and has a value, varying with the exchange, of about 25d. The real was first coined in Spain in 1497. It is also the 24th part of age in Portugal, equal to the equivalent of 40 reis. In Java it is the name of a weight for gold and silver articles, corresponding to 17 dwt. 14 gr. troy weight.

Real is a term used by lawyers to describe the nature of certain rights and actions. The rights of an owner of property are real rights, i.e., he has a right to sue and to recover specified things or services against all other persons. Contractual rights, on the other hand, are personal—i.e., they are good only against the person who is bound to perform the contract. Forms of action are classified according to the nature of the right which is in dispute. The Roman law gave special names for the recovery of any thing, whether movable or immovable, which was withheld from the person entitled; an action in persona was the form in which compensation could be obtained for breach of contract or other wrongful act. In Scotland, there is another category, where the interest of the owner has been studied and followed, real rights and real actions are defined very much as they were defined by the civilians; England has taken a course of its own. At the time when the common law was taking shape land was of primary importance. The owner of chattels (movable things) was entitled to damages if his property was detained from him or converted to the use of another; but he had no real action to recover the thing itself. A real action was an action to recover land or some right connected with land. Some interests (e.g., the right of a tenant under a lease) were regarded as personal rights against the owner; in technical language the interest of a tenant for years is a chattel real, or a chattel which savours of the reality. The English law of property frames all its rules with reference to these distinctions

Realgar. See ARSENIC.

Realism in philosophy is diametrically opposed to Nominalism, as involving the belief that given and specific real things, existing independently of our conceptions and their expression, and that these are alike actually the object of our thoughts when we make use of the terms. Again, as opposed to Idealism, the word implies an intuitive cognition of the external object, instead of merely a mediate and representational knowledge of it. In art and literature the word Realism or Naturalism is employed to describe a method of representation without idealisation, which in our day in France has been raised to a system and claims a monopoly of truth in its artistic treatment of the facts of the material world and life. It claims that the enthusiasm and exaggerations of romanticism must give place to a period of reflection and criticism; that we must not select from the facts put before our eyes, but merely register them and the sensations they engender for themselves alone, apart
from all considerations of mere beauty, to say nothing of religion or morality; and that the experimental romance must hereafter follow the right course, the creation of man, and not on 'human documents' supplied from the close observation of the present, or from laborious erudition—the retrospective observation of the past. As a gospel this militant Realism is the offspring of the Positive philosophy and the physiology and the social science, and in the hands of its apostles, it has become a new morality which reforms not by precept but example, not by the attraction of the good, but by the repulsion of the evil. The practical result is that for French realists there is in the moral world only the evil, in the visible world only the ugly; and the triumphs of our modern fiction are the pitiless impersonality of Madame Bovary, the cold splendours of Salammbô, the brutal vulgarities of Zola, the refined sensuality of Bourget and Guy de Maupassant, the pretentious inanity of the Goncourt brothers, and the dreary pessimism of Dostoevsky and Tolstoi. If realism were perfect it would include all reality, order as well as disorder, the general as well as the particular, the lofty as well as the low. For there are men and women who are neither selfish nor drunken, nor heartless, nor heart-rending; but if your Paris is not the universe; your hospital-wards may contain cases of all moral maladies, but you forget the moving world of health and life outside its walls; your vaunted collection lacks one speci- men, not the rarest, and certainly the loveliest. For the dream is as true a leaf of life as the sober vision, and idealism is the permanent revenge of man over the inequalities of life—the protest of creative mind against external fatality. Idealistic art seizes life at its richest moments, and presents it preserved for ever by its immediate likeness and constancy and degradation. This so-called realism is not reality—the steps of true art must ever be elimination and generalisation; its postulates, the eternal conventions of form, style, language, and subject, necessary because they are elemental.

Real Presence. See Lord's Supper, Transubstantiation.


Reaping. The act of cutting corn, was from ancient times until about the 18th century performed with an instrument called a reaping-hook or sickle. The sickle in use among the ancient Jews, Egyptians, and Chinese appear to have differed very little in form from those employed in Great Britain. The reaping-hook is a curved instrument of about a foot and a half in length, tapering from a breadth of about two inches at the butt-end, where it is fixed into a wooden handle. The edge is sometimes serrated; but, as a rule, it has long been made plain and sharp like a knife. In many parts of the British Isles it was sup- pressed by the custom of paying by the acre in the 19th century. In other parts it lived until the modern reaping-machine was ready to take the place of it as well as of the scythe. The sickle or hook did its work admirably, but it was necessarily slow. On small farms in some districts it is still employed; and occasionally on large farms, when the crop is much laid and twisted, it is resorted to. By the scythe the corn can be cut at a rather less cost per acre than with the hook; but the work is not always so neatly done. As nice a sward will be left by hand with the scythe, and often nearer than by the hook, but the sheaves are not, as a rule, so tidy after the scythe, though they will stack rather earlier. Of a fair working crop an adept at the scythe would cut 2 or 2½ acres per diem. The average, however, would not exceed 1½ acres. In fact, if the crop is heavy, that extent is a very hard day's work.

An attempt to trace the history of the reaping-machine would carry us far back into the earlier stages of agriculture. Pliny the Elder, who was born early in the 1 st century of the Christian era, found a reaping-machine in Gaul. He says, 'In the extensive fields in the lowlands of Gaul vams of large size, with projecting teeth on the edge, are driven over the standing corn by an ox yoked in a reverse position. In this manner the ears are torn off, and fall into the van.' Palladius, about four centuries later, found a similar appliance for reaping corn in Gaul. He gives a more detailed but similar description of the machine. Fig. 1, copied from Mr Woodcroft's Appendix to the Specifications of English Patents for Reaping-machines, represents what is conceived, from the descriptions, to have been the form of this machine.

In modern times the idea of a mechanical reaper appears to have originated with Capel Lofft (q.v.), who in 1785 suggested a machine something after the pattern of the ancient one described above. Between that time and the Great Exhibition of 1851 in London, from which the general use of mechanical reapers may be said to date, the patents taken out for reaping-machines were very numerous. Among the most promising of these may be mentioned those of Mr Gladstone of Castle-Douglas; Mr Smith of Deanston; Mr Kerr, Edinburgh; Mr Scott of Ormiston; Mr Dobie, an actor in Birmingham; Mr Mann of Ruby, near Wigton; and the Rev. Patrick Bell of Carnwallow, Forfar- shire. In 1826 Mr Bell constructed an efficient and simple machine, which long continued in use, and several features of which are observable in the reapers of the present day. The inventor of this, the first machine of the kind in Scotland, received a public testimonial from agriculturists, in consideration of the services he thus rendered to agriculture. In America Mr Hussey and Mr McCormick took out patents for reaping-machines of superior character in 1833 and 1834 respectively. The movements of the cutters of these machines were various. A few were advancing only, some sidelong and advancing, others reciprocating and advancing, a large number continuous and advancing, and others continuous and alternating. The reciprocating and advancing motion is that now employed on the machines in use.

The principal difference in the machines now so largely used for cutting corn is in the form and character of the cutters, and in the mode of delivering the grain and straw. Both are attached to a bar, and are made to work through another bar of iron fitted with hollow fingers, called guard-fingers, which, projecting forward, catch the standing corn, and retain it firmly until it is cut. The serrated knife saws through it, the plain knife clips it, as it were, the finger-guard forming the fixed blade of the scissors.
The delivery of the sheaves divides the machines into three kinds—(1) those delivered by manual labour; (2) those delivered by mechanical labour, or self-deliverers; and (3) combined reapers and binders, which deliver the sheaves ready bound. The delivery of the sheaves by manual labour is now chiefly at the back of the machine, the side-delivery being generally abandoned, unless in the self-deliveries. In delivering the grain, a man, with a short-handled rake in his hand, sits upon the machine almost opposite the cutting apparatus. With this he inclines the grain towards the knife; and, when sufficient has been cut to make a sheaf, he rakes it off the platform of the machine, on to which it has fallen, and deposits it on the ground. With the back-delivery the sheaves must be tied up and removed out of the way of the machine before it comes the grain towards the cutter. By an ingenious eccentric motion, the rakes are made to sweep the sheaves off the platform at intervals of about 12 feet apart, to the side, and out of the way of the horses. The self-deliverer costs from £25 to £30.

The more recent automatic combined reaper and binder promises to supersede entirely all other reaping-machines. The general appearance and arrangement of Howard's light steel-frame sheaf-binder is shown in fig. 3. The cutting portion of the binder is very similar to that of an ordinary reaping-machine. The cut grain as it falls back on the machine is conveyed by an endless web over the top of the driving-wheel to the knotter. Here it falls into two arms called compressor jaws. These retain it on the knotter table till a sheaf of the prescribed size has accumulated. 'Whenever a sheaf of the desired size has been delivered to the compressors, these relieve the tripper, which sets in motion the needle (carrying the binding twine) and the knotting apparatus. The needle is circular, and in its course it passes the band (twine) round the sheaf, when the band is caught by the knotter, and almost instantaneously a firm and secure knot is tied, while the needle is drawn back ready to operate on a new sheaf. As soon as the knot is tied and the string cut, the sheaf is ejected from the machine in a horizontal position, dropping gently on the ground on its side quite clear of the machine' (Book of the Farm). With a moderate crop of standing grain the binder in its various improved forms does its work in a most admirable manner, though when the crop is badly 'laid' it cannot be used satisfactorily. It is expeditious, and surpasses all other methods in neatness and thoroughness of work. When the binder was first introduced the thresher was the same as at present. There were strong objections to its use, however, and it was not until twine was substituted that the invention made any headway. There are now several British firms engaged in making binders, which are gaining in popularity year by year. A binder costs about £26.

See Woodcroft's Appendix to Patents for Reaping-machines; Mr. Jacob Wilson's 'Essay on Reaping-machines,' in Transactions of Highland Society for January 1864; Book of Farm Implements and Book of the Farm, by Henry Stephens; J. C. Morton's Cyclopaedia of Agriculture.

**Reason.** See the articles in this work on Psychology, Logic, Induction, Sylogism, Kant, Philosophy, and works cited under these.

**Réaumur.** RENE ANTOINE FERCHAULT DE, physicist, was born at La Rochelle, 28th February 1683, and studied in the Jesuits' College at Poitiers, and afterwards at Bourges. In 1703 he went to Paris, where he attracted general attention by the publication of three geometrical Memoirs; and in 1708 he was elected a member of the Academy of Sciences, and was charged with the supervision of the work Description des Divers Arts et Métiers, published under the auspices of the government.

Réaumur lightened his labours with occasional researches into various subjects of natural history. These researches occupied him from 1708 to 1715, and were followed by a series of investigations into the condition of the woods, auriferous rivers, and turquoise mines of France. The collections of Memoirs of the Academy of Sciences from 1722 till 1725 contain a number of papers by Réaumur,

---

**Fig. 2.—Samuelson's Self-delivery Reaping-machine.**

In sheaves. Samuelson's sheaf-deliverer will be made plain by fig. 2. The machinery consists of a series of four rakes—two toothed and two plain—attached to an upright shaft in such a manner as to admit of a free ascending, descending, and horizontal motion. The two toothless rakes or 'dummy' are shorter in the arms by six inches than the other two, and are merely employed to incline the grain towards the cutter. By an ingeniously eccentric motion, the rakes are made to sweep the sheaves off the platform at intervals of about 12 feet apart, to the side, and out of the way of the horses. The self-deliverer costs from £25 to £30.

The more recent automatic combined reaper and binder promises to supersede entirely all other reaping-machines. The general appearance and arrangement of Howard's light steel-frame sheaf-binder is shown in fig. 3. The cutting portion of the binder is very similar to that of an ordinary reaping-machine. The cut grain as it falls back on the machine is conveyed by an endless web over the top of the driving-wheel to the knotter. Here it falls into two arms called compressor jaws. These retain it on the knotter table till a sheaf of the prescribed size has accumulated. 'Whenever a sheaf of the desired size has been delivered to the compressors, these relieve the tripper, which sets in motion the needle (carrying the binding twine) and the knotting apparatus. The needle is circular, and in its course it passes the band (twine) round the sheaf, when the band is caught by the knotter, and almost instantaneously a firm and secure knot is tied, while the needle is drawn back ready to operate on a new sheaf. As soon as the knot is tied and the string cut, the sheaf is ejected from the machine in a horizontal position, dropping gently on the ground on its side quite clear of the machine' (Book of the Farm). With a moderate crop of standing grain the binder in its various improved forms does its work in a most admirable manner, though when the crop is badly 'laid' it cannot be used satisfactorily. It is expeditious, and surpasses all other methods in neatness and thoroughness of work. When the binder was first introduced the thresher was the same as at present. There were strong objections to its use, however, and it was not until twine was substituted that the invention made any headway. There are now several British firms engaged in making binders, which are gaining in popularity year by year. A binder costs about £26.

See Woodcroft's Appendix to Patents for Reaping-machines; Mr. Jacob Wilson's 'Essay on Reaping-machines,' in Transactions of Highland Society for January 1864; Book of Farm Implements and Book of the Farm, by Henry Stephens; J. C. Morton's Cyclopaedia of Agriculture.

**Reason.** See the articles in this work on Psychology, Logic, Induction, Sylogism, Kant, Philosophy, and works cited under these.

**Réaumur.** RENE ANTOINE FERCHAULT DE, physicist, was born at La Rochelle, 28th February 1683, and studied in the Jesuits' College at Poitiers, and afterwards at Bourges. In 1703 he went to Paris, where he attracted general attention by the publication of three geometrical Memoirs; and in 1708 he was elected a member of the Academy of Sciences, and was charged with the supervision of the work Description des Divers Arts et Métiers, published under the auspices of the government.

Réaumur lightened his labours with occasional researches into various subjects of natural history. These researches occupied him from 1708 to 1715, and were followed by a series of investigations into the condition of the woods, auriferous rivers, and turquoise mines of France. The collections of Memoirs of the Academy of Sciences from 1722 till 1725 contain a number of papers by Réaumur,
in which he details his discoveries of the mode of producing steel from iron, and of the mode of tinning iron. For these and other researches he received the prize of the French government a sum of 12,000 livres, which he spent in promoting and encouraging the industrial arts in his native country. In 1739 he succeeded in producing an opaque glass which was equal to the porcelain of Saxony and Japan. His invention of the Thermometer (q.v.) which bears his name need not be more than mentioned here. He died of a fall from a horse, 17th October 1757, leaving behind him a voluminous collection of works on all the subjects above stated, also a treatise on "the silk of spiders," a "Thermometric researches on air," and on mixtures of fluids with fluids or solids, and his Mémoires pour servir à l'Histoire des Insectes (Amsterdam, 12 vols. 1757-48).

Rebec (Arabic rebab), an ancient musical instrument of the violin kind, of which the body, originated from that once speaking to the inhabitants, like other instruments of the same tribe, was narrow towards the neck, and gradually enlarged till it rounded off at the lower end. Milton, in his L'Allegro, characterises this instrument as the 'jocund rebec.'

Rebecca Riots, 문서 of popular outbreaks which occurred in Carmarthenshire in 1843-44, and quickly spread over Pembroke, Cardigan, and Brecon. They grew out of the impatience of the people at the great increase of toll-gates on public roads, and owed their singular name to their adopting as a motto Genesis, xxiv. 60. Bands of men live hundred strong, their leaders disguised in women's clothes, secured the country by night, threw down the toll-bars, and then dispersed. A strong force of soldiers was poured into the country, but the rioters offered an obstinate resistance, and were not put down without great difficulty and consider- able bloodshed. The commission appointed by government to inquire into the causes of the outbreak found that it grew out of a genuine public grievance, whereupon measures of relief were introduced. The rioters seized were punished lightly.

Rebellion. 'The Great Rebellion' generally means the rising of the Long Parliament against the authority of Charles I. (q.v.). See also CROM- WELL, FALKLAND, HAMPDEN, &c.; ENGLAND (p. 592); and the works of S. R. Gardner. The revolts on behalf of the House of Stuart in 1715 and 1745 are often, particularly in Scotland, spoken of emphatically as 'The Rebellion' (see JACOBIUS). The term is applied in the United States to the secession of the southern states.

Receipt, an etymological representation of a name or thing by using pictorial devices for letters, syllables, or parts of words. The term probably originated from a desire speaking to the beholder non verbis sed rebus. Devices of this kind, allusive to the bearer's name, were exceedingly common in the middle ages, particularly in England. In many instances they were used by ecclesiastics and others who had not a right to armorial ensigns. See BAGGE.

Récamier, Madame (née JEANNE FRANÇOISE JULIE ADELAIDE BERNARD), a famous Frenchwoman, was born at Lyons, 4th December 1777. She grew up a girl of remarkable grace and beauty, and at fifteen she was married to M. Jacques Récamier, a rich banker about three years her own age. Her face was soon filled with the brightest wits of the literary and political circles of the day, but fortunately for herself Madame Récamier possessed a temperament that saved her from temptation and almost scandal. For Madame de Staël she had a warm affection that survived the exile required by the jealousy of Napoleon. Soon after this her husband was completely ruined, and Madame Récamier visited Madame de Staël at Coppet in Switzerland (1806). She met Prince August of Prussia, who alone of all her innumerable admirers is supposed to have touched her heart. Indeed a marriage was arranged, provided M. Récamier would consent to a divorce. The good man did not refuse, but his kindness was too much for the generous heart of Madame Récamier, who declared she could not leave him in his adversity. The most distinguished friend of her later years was M. de Chateaubriand.

In 1840 he became a whilower, and he then wished to marry Madame Récamier. But the long presence of her husband had been dead since 1830, but the lady declined the honour without interrupting the current of their friendship. Chateaubriand died 4th July 1848, and she followed him to the grave on 11th May 1849.

Receval, a town of Italy, 15 miles S. of Ancona, has a Gothic entablature with a monument to Pope Gregory XII. Here Leopardi was born. Pop. 3884. Porto Receval, 6 miles N.E. on the Adriatic coast, has a pop. of 3046.

Receipt is the technical as well as popular term signifying a legal acknowledgment of money received in the course of a deal between men. In England it is often believed that a written receipt is the only legal proof of payment; the fact being that it is only one mode of proving it. If the money be paid in presence of witnesses, or even without witnesses, provided a judge or judge believe the statement on oath of the party paying it, then it is in England quite as good evidence of the pay- ment as if a written receipt were given; and even a written receipt is conclusive only where it is under seal, or endorsed on a conveyance under the Conveyancing Act 1881, unless the purchaser had notice to the contrary, or the conveyance was to be cancelled before delivery, otherwise the receipt is inadmissible as evidence of payment; but on payment of certain penalties the receipt may be after-stamped with an impressed stamp. Not only is a receipt proper subject to stamp-duty, but also any note or memorandum given to a person on payment of money, and acknowledging payment of any part of a debt or demand, whether signed or not; so receipts given on payment of bills of exchange or promissory-notes are liable to stamp-duty. But a mere acknowledgment of indebtedness makes the receipt of the money itself not stampable as a receipt. There are several exceptions from liability to stamp-duty. Such are receipts for deposits with bankers to be accounted for; receipts for any parliamentary taxes or duties, or for any payment to the Sovereign; receipts by officers, such as taxes, excises, or duties to be paid; receipts for purchase of government stock or for money due under Exchequer Bill; receipts written on any bill or note of the Bank of England or of Ireland, on the back of duly stamped bills of exchange or promissory-notes, or upon the back of duly stamped instruments acknowledging the receipt of money; and generally receipts to or by government departments. At one time, under the Act of 1803, it was supposed to be the duty of the debitor to provide stamped paper for a receipt, the
creditor being liable in a penalty of £10 if he refused to sign. This act, however, is repealed, and the better view is that when the debtor tenders payment the creditor is bound to accept it, and if he refuses to do so the discharge is void. The validity of the discharge being regulated by custom. In Scotland the receipt of money cannot be proved by witnesses where the debt was created by writing, and it is not allowed to dispute the validity of a written receipt except in cases of fraud. It is only in the case of where the receipt of the price can be proved by parol. See Tisley's Stamp Laws (3d ed. 1871).

Receiving Stolen Goods. See Theft.

Recent Period. See POSTGLACIAL AND RECENT SYSTEM.

Recidivists, in France, are the habitual criminals. In 1883-84 the French government proposed to send them to New Caledonia, giving them a certain measure of freedom; but against this proposal the Australian colonies protested most vigorously. See NEW CALEDONIA.

Recife. See PERNAMBUCO.

Reciprocity, in Political Economy, a term for an arrangement between two countries having a protective tariff against other countries, to admit each into the other's territories certain specified taxable articles of commerce duty-free or at exceptionally light duties. The clauses of articles are arranged to bear one another on one side and the other. Such mutual arrangements are sometimes called Fair Trade (q.v.) as opposed to Free Trade (q.v.) and thorooughgoing Protection (q.v.), and has been advocated as between Britain and her colonies. The mutual relation between Canada and the United States, advocated in 1883-91 by a powerful party in Canada as well as on the other side of the frontier, proposed a complete commercial union—Zollverein (q.v.)—so that, while between Canada and the United States there should be no tariff at all, all goods from the rest of the world (including Great Britain) should have a strong protective tariff to face. See A. J. Wilson's Reciprocity, &c. (1880).

Recitative. See MUSIC, OPERA.

Reclamation. See WASTE LANDS.

Recueil, Jean Jacques Élisée, geographer, was born at Sainte-Foix la Grande (Gironde) on 15th March 1830, and educated at Montauban and under Carhart, 1846. He left France after the coup d'état of 1851, and spent the next seven years in England, Ireland, North and Central America, and Colombia. He returned to Paris in 1858, and published Voyage à la Sierra Nevada de Sainte-Morte (1861), and an introduction to the Dictator de l'Université de la France (1864). For being concerned in the Communist outbreak of 1871 he was banished from France, but returned under an amnesty in 1879. Whilst living in exile in Switzerland he began his great masterpiece, Nouvelle Géographie de l'Emper (17 vols. 1870-91). A Professor at Brussels since 1893, he has also written a great physical geography entitled La Terre (2 vols. 1867-68; Eng. trans. 1871 and 1875); Histoire d'un Russie (1866); besides Les Phénomènes Terrestres (1873) and Histoire d'une Montagne (1880).

Recognition is a kind of judicial bond entered into by the debtor and the object of which is to secure the doing of some act, as the appearance of witnesses at a criminal trial, or the keeping of the peace by one who has threatened or assaulted another. The form of it is thus: A B doth acknowledge to owe to our lady the Queen the sum of ten pounds, or some other sum, to be levied of his goods if he fail in the condition endorsed; and then a condition is added, which states that, if the thing secured is done, then the recognisance is to be void. This is the mode by which justices of the peace secure the attendance of the parties. The Court may issue a passport to any prisoner who has been committed for trial, or the future good behaviour of one who has committed a breach of the peace. If the thing secured is not performed, then the recognisance is estreated—i.e., extracted and put in force, a debt of the amount specified being forsworn by the crown.

Recoil. See CANNON, GUNNERY, MONCHIEFF PITS.

Recollets (Lat. recollectus, 'gathered together'). See FRANCISCANS, Vol. IV. p. 793.

Record, as a legal term, is used in the United Kingdom to signify anything entered in the rolls of a court, and especially the formal statements or pleadings of parties in a litigation. In general the rule is well settled that the pleadings which make up the record do not enter into details of the evidence, but merely set forth the conclusions or inferences, leaving the details of evidence to be supplied at the trial before a jury, or, if there is no jury, at the hearing before the judge or court. Hence in a suit of a nature involving the trial the court or judge can commit for contempt any person who insulfs the court or wilfully obstructs the business. A trial by record means that one of the parties has set up some former decision of the court, while the other denies that such a decision ever existed; whereas, in the ordinary trial the only manner of solving the question is by producing the record of the former action, and so settling the dispute. In Scotland the closing of the record is a step which requires the sanction of the judge, who elects the record after each party has said all he wishes them to be by way of statement and answer.

Recorede, Robert, mathematician, was born about 1500 at Tenby, in Pembrokeshire, Wales. He completed his education at Oxford, but, wishing to make medicine his profession, removed to Cambridge, where in 1545 he received the degree of M.D. In 1547 he was in London, engaged in the composition of The Urnul of Physic (1548), and was about the same time appointed physician to Edward VI., as afterwards to Queen Mary. Ten years later we find him in the debtors' prison in London, where he died miserably in 1558. His works are all in the form of dialogues between a master and his pupil, written in the rude English of his time; they are The Grounde of Artes, teaching the Perfect Work and Practice of Arithmetike (1543); The Pathways to Knowledge (1551), an abridgment of Enchy's Elements; The Castle of Knowledge, containing the Explication of the Sphere both Celestial and Material, (1551), an astronomical work, in which he compares the Ptolemaic and Copernican systems; The Wetsstone of Wit (1557), a treatise upon algebra. In the appreciation of the general results derivable from algebraic formulæ he is far beyond his contemporaries, with the exception of Vieta (1528-1603).

Recorder is a judge of a city or borough court of quarter sessions. He must be a barrister of not less than five years' standing, is appointed by the crown, holds office during good behaviour, and the salary is paid by the city or borough out of the borough fund. He sits as sole judge of the court of quarter sessions, but he cannot grant licenses or be an official in licensing matters, or order rates to be levied. The recorder is not prohibited from practising at the bar, and indeed his salary is usually small. He can appoint as deputy, in case of necessity, a barrister of five years' standing, and is the constant magistrate of the district. In London he is elected by the Lord Mayor and aldermen, and as 'mouthpiece of the
city,' he certifies the customs of London. He is chief judge in the Mayor’s Court of London, and is one of the judges sitting at the Central Criminal Court, the Exchequer Court, and the High Court of Admiralty; the many well-known men who have held this post were Lord Coke and Lord-chancellor Jeffreys. There is no such office in Scotland, but the sheriff discharges similar duties.

**Recorder**, the name of an old musical instrument somewhat like a flageolet, but with the lower part wider than the upper, and a mouthpiece resembling the beak of a bird.

**Records, PUBLIC** (Lat. recordari, 'to remember'), contemporary authenticated statements of the proceedings of the legislature, and the judgments of those higher courts of law which are distinguished as Courts of Record. An act, 1 and 2 Vict. chap. 94, sets at rest the question what is legally to be held a record, by providing that the word records shall be taken to mean all rolls, records, writs, books, proceedings, decrees, bills, warrants, accounts, papers and documents whatsoever belonging to Her Majesty, or then deposited, or which ought to be deposited, in any certain places of custody which are enumerated. This statute, together with the Act 40 and 41 Vict. chap. 53, has placed under the care of the Master of the Rolls the vast mass of documents stored in the Public Record Office.

Parchment is the material on which the greater portion of the records are written. The so-called ‘rolls’ of the several courts are comparatively short skins attached at the top after the manner of books, but the lines of the writing run parallel to the line of binding. In other cases they are sewed together consecutively, as in the same way the Patent and Chancery rolls, and in the Royal Courts of Justice have for the past length. Some records are in the form of books, as Domesday; others are filed—i.e. each document is pierced with a string or gilt pass through it, the whole being fastened together in bundles. Many of the later records are written on paper.

The early parliamentary records and statutes are principally in Norman-French, which continued in partial use till the time of Henry V.; all the other great series of records, except those of parliament, are in Latin down to the reign of George II. For later, except during the Commonwealth, when English was substituted.

Public records, which can be traced in germ before the Conquest, gradually expanded under the Norman and Plantagenet Kings. They enabled the subject to defend and maintain those feudal rights and privileges which were gradually eroding on royal prerogatives, and to protect himself from arbitrary exactions; while to the king they furnished precedents which could not be questioned for his calls of military service and taxation.

The various courts being the King’s Courts, and founded on the several times and places; the earliest depositories were the royal palaces in different parts of England; but when the higher courts were permanently established at Westminster, ‘treasuries’ or places of custody of the records of the courts, were appointed there. A portion of the public records were, as far back as Henry III.’s reign, deposited in the Tower of London and the New Temple; and in the reign of Edward III. the Tower became a permanent treasury. The parliamentary committee of 1837 enumerated among the places of deposit a room in the Tower over a gunpowder magazine, and close to a steam-engine in daily operation; a chapel at the Rolls, where divine service was performed; underground vaults at Somerset House; damp and dark cellars at Westminster Hall; the stables of the late Carlton Ride; and the Chapter-house, Westminster. From the reign of Edward IV. downwards the Exchequer records have often been called to the safe custody and arrangement of the records as an object of solicitude. The fullest examination in recent times was made by a committee of the House of Commons in 1800, whose report presents the most comprehensive account of the records in existence. A deputy was appointed to go on with the work which the committee had begun, and was renewed six times between 1800 and 1831. All the several record commissions directed the commissioners to cause the records to be methodised, regulated and digested, bound and secured, and to have calendars made, and original papers printed; and numerous valuable publications have been issued by the commissioners from time to time. The new edition of Rymer’s Foedera, the calendar of Inquisitiones Post Mortem, and the editions with excellent indexes of the earlier Patent and Close Rolls and the Rolls of the Curia Regis are especially to be noted. An inquiry as to the materials for English history to be found in the Vatican and other foreign libraries was instituted about 1834 by the Record Commissioners, and the results were printed under the title of Additional Records, but have never been formally published. Copies, however, were disseminated, and may be consulted in the British Museum Library and elsewhere, but the report itself has never appeared. Following this example, agents have been employed by the Public Record Office to stay at Paris, Rome, Venice, and Rome for many years, and the results of their labours have been partly published, while the remainder may be consulted at the Record Office.

A full investigation into the proceedings of the Record Commissioners is found in a committee of the House of Commons in 1835, and since 1840 annual reports have been issued by the Deputy-keeper of the Records. By the statutes referred to above the Master of the Rolls is empowered to appoint a deputy-keeper of the records, and, in conjunction with the Treasury, to do all that is requisite in the execution of this service. He makes rules for the management of the office, and fixes what fees may be demanded. He allows copies to be made, which, when certified by the deputy and assistant keepers, and authenticated with the seal of the office, are prima facie evidence in courts of law. The Home Secretary directs from time to time such of the catalogues, calendars, and indexes, and such of the records as he thinks fit, to be printed, and sold at prices fixed by him. All Record publications may be procured directly from the Queen’s Printers, East Harding Street, Fleet Street, and detailed catalogues of them may be obtained from the same source.

The present Public Record Office, a handsome fireproof building in Petty Lane, was begun in 1851 on a plan which admits of extension as the needs of the times may require. It must be remembered that modern documents as well as old form the subject of the deputy-keeper’s care), and provision has been made for the transfer into his hands of the records which are growing from day to day in the great administrative and legal departments of the government, as soon as they have ceased to be needed for frequent reference.

The principal contents of the Record Office may be classified under seven principal groups. Records of (1) the Superior Courts of Law, including the Courts of Chancery, Queen’s Bench, and Common Pleas, and the Exchequer, with its important financial as well as legal machinery; (2) Special and Abolished Jurisdictions, such as the Courts of Arches, Chivalry, Requests, and Star-chamber; (3) Duchy
of Lancaster; (4) Palatinate of Durham; (5) Palatinate of Lancaster; (6) Principality of Wales; (7) The Collections of the Most Important Public Records of Great Britain, by C. Burton Cooper (2 vols. 8vo, 1832); Official Handbook to the Public Records, by F. S. Thomas (8vo, 1853); Our Public Records, by A. C. Ewald (8vo, 1873); and A Guide to the Principal Classes of Documents preserved in the Public Record Office, by S. R. Scargill-Hill (8vo, 1891). An introduction to the art of searching for materials, whether historical, topographical, genealogical, or legal, is afforded by the present writer's Records and Record-searching (8vo, 1888), while a person not acquainted with the ancient legal terms cannot do better than consult C. T. Martin's edition of Wright's Court Hand Restored.

This contains useful glossaries, lists of abbreviations, ancient alphabets, and specimens of the old handwriting, which vary greatly from century to century. See Paleography.

In the various classes of materials on record, it is not always easy to imagine from the fact that, to cite only two classes of documents, there are more than 18,000 Close Rolls, and many thousands of Corn Roll and De Banco Rolls, each of the latter in the Tudor period containing from 500 to 1000 skins of parchment.

The supreme need of such a depository are indexes, and indexes to indexes. The latter requirement is tolerably supplied by the 'List of Calendars, Indexes, &c.' in appendix ii. to the 41st Report of the De Lacis, (8vo, 1890); but the indexes themselves to which this list of 745 items in a directory are sadly deficient. They do not furnish guidance to a twentieth part of the mass of documents, and many of them are merely eclectic. A recent addition to this series is 'General Plan' by Harlan's voluminous MS. Index to the De Banco and other rolls, which has been acquired at the public expense.

Numerous charters of the greatest antiquity are to be found in the Public Record Office, and there of course is preserved Domesday Book; but, understanding by 'charters' a fairly continuous series of official documents, we may say that the earliest are the Pipe Rolls or Great Roll of the Exchequer. That for 31 Henry I. stands alone, but is soon followed by an unbroken series of Pipe Rolls extending from 2 Henry II. down to modern days. These are accounts of the revenue of the kingdom both as regards receipt, and expenditure, and they contain items of the greatest possible historical interest. The Pipe Roll Society (established 1884) is gradually printing them. Next in order of antiquity are the Patent Rolls, which begin with 3 Henry I. but do not cover more than a day, and the Close Rolls, which present a similarly unbroken series from 1294. The former contain matters patent or open to the public, such as grants of offices, crown-lands, liberties, confirmations of previous grants, grants to corporate bodies, patents of migrating or new towns, lists of officers, grants of fines, quarterings, proclamations, safe-conducts, presentations to benefices, restitutions of temporalities to bishops, abbots, &c.

The Close Rolls contain mandates, letters, and writs of a private nature which were closed or sealed, and were reserved to domestic and public matters, orders to the sheriffs on all kinds of questions, and directions as to raising subsidies. The historical value of these two series of Rolls is immense, as in the earlier years all the state correspondence, both foreign and domestic, is recorded in one or other of them.

Other titles in the Public Records, either from the reign of Edward I. or from still earlier times are the Carte Antique, early transcripts of charters ranging from Ethelbert, king of Kent, to Edward I.; Charter Rolls, containing the king's grants of land, dignities, &c.; Exchequer Rolls, accounts of military and property forfeited to the crown; Feet of Fines, records of the endings of fictions suits as to land, which are in reality deeds of conveyance, ranging from 7 Richard I. to William IV.; Rotuli Curiae Regis, some of which are as early as Richard I., and are records of the cases decided in the King's Court up to the reign of Edward I., by whom the court was divided into the King's Bench, Common Pleas, and Exchequer; Cornum Regis Rolls, or records of the crown side of the King's Bench, including Assize, Eyre, Coroners, and Great Delivery Rolls; De Banco Rolls, or records of the Court of Common Pleas; Inquisitiones Post Mortem, a treble series (Chancery, Wards and Liveries, Exchequer) of inquiries as to the land held by tenants in capite at time of decease, and as to their heirs; original Rolls of the Exchequer, containing entries of any service, rent, or other payment due to the crown; antient rolls; Subsidy Rolls, also Exchequer documents, often containing the names of the taxpayers under villages and towns, and most valuable to the topographer; Pell Records, including the Liberato Rolls and Issuaco Rolls, consisting of entries of payments of salaries, pensions, &c.; Customs Rolls for various ports; Memoranda Rolls (Exchequer), enrollments of writs of Scire Facias, informations, outlawries, and a multitude of other matters; Pardon Rolls, enrolments of pardons up to 2 James I.; Quo Warranto Rolls, respecting derivations of offices or franchises; Ordinary, or Paper Rolls, offerings to the king for renewals of charters, enjoyment of lands, offices, and privileges; Parliament Rolls, petitions to and proceedings in parliament, beginning from the reign of Edward I.; State Rolls, the Journals of the Lords and Commons from Henry VIII., and other parliamentary records.

The foregoing are more or less continuous records, but there are some of an occasional character or of limited annual duration, but still of great importance, such as the Hundred Rolls, presentations of injustice claims, charters of privileges to boroughs and manors, franklendage, and assizes of bread and ale; the Liber Niger, and Liber Rubens Sexacarii, and Testa de Nevill, lists of tenants in capite and knight's fees; Taxatio Ecclesiastica, an account (1291) of the taxation of benefices; Inquisitiones Nonarum, which included a valuation of benefices in the fourteenth year of Edward III.; French Rolls, Norman Rolls, Gascun Rolls, copies of treaties, truces, orders, summonses, grants of safe-conduct, and other matters respecting the affairs of those parts of France which went under the English crown, and Kinds of Letters, or Writs of Privilege, in 20 Henry VII.; Flaga de Secretis, trials for state offenses of a specially secret nature, from Anne Boleyn to the Stuart adherents of 1715 and 1745; Royalist Composition Papers (1649-60), containing statements as to estates and families of nobility.

The state records (Domesday, Foreign, Colonial, Irish, and Scotch) originally sprung from the Privy-council and Chancery, and include the correspondence of the Privy-council, secretaries of state, and other public departments, with miscellaneous correspondence from the time of Henry III. These, being the correspondence of the highest political officers of the kingdom, relate to an infinite variety of matters. They have been carefully arranged, and more than 120 volumes of
calendars, covering a large portion of the field, have now been published.

The activity of the authorities of the Public Record Office has, however, not been confined to the records stored in Fetter Lane, for since 1858 the Master of the Rolls has issued, under the authority of the Crown, various parts of the series known as Chronicles and Memorials of Great Britain and Ireland. These are carefully edited texts of the ancient chronicles, such as William of Malmesbury, Gervase of Canterbury, William of Newburgh, and Matthew Paris, collated with other manuscript sources in libraries, and prepared by specially selected editors.

The Historical Manuscripts Commission, though not in name a department of the Record Office, is in reality closely connected with it. In answer to requests from this body, private libraries and municipal rooms all over England, Ireland, Scotland have, almost without exception, been thrown open to authorised visitors, who have reported on their principal MSS. contents. Since 1857 many volumes of reports on these collections have been published, embodying transcripts of documents of a public nature, and giving brief abstracts of a host of others.

The Literary Search Room at the Public Record Office is open from 10 to 4 every day, except Saturday, when it closes at 2 o'clock, and a few private rooms also are open on Saturday. Any respectable person may, on entering his name and address in a book kept in the lobby, attend and consult almost any document he may desire to see. A few of course are subject to special reservation.

Scotland.—The public records of Scotland were unfortunately preserved at Edinburgh as early as 1282, as appears from an inventory of muniments examined in that year by the order of Alexander III.; and another inventory of Scottish rolls and writs was compiled at the command of Edward I. of England in 1291. Few, if any, of the documents mentioned in these lists are now known to exist. In 1631 the records of the Scottish parliaments and courts of justice were removed by Cromwell to the Tower of London. The more important of these, to the number of 1699 volumes, were restored in 1657, and the remainder, after the rest of the Advocates Library were packed in eighteen five hogsheads and shipped on board a frigate for Scotland; but in a violent storm they were transferred to a smaller vessel, which went down with its precious cargo. The control of the records has often been exercised by the Clerk of the Rolls and Register, or Lord Clerk Register; one of the high officers of state, who had a seat in the Scottish parliament, and to whom, and his deputies and other officers appointed by him, it was assigned to superintend both the formation and custody of the public records. These were at first in the inconvenient form of rolls, but in the reign of David II. the practice was introduced of writing them in books. By an act of 1463 the king's rolls and registers were appointed to be put in books; but the accounts in the Exchequer continued in rolls, as they had been kept in rolls early as the passing of another act in 1672, appointing them to be written in books. Originally the records were kept in the Castle of Edinburgh, but in later times they were deposited under care of the Clerk Register, in the Leith Parliament House, now part of the Advocates' Library; an edict before the Union the whole records were transferred to that depository, where they continued till the erection of the large building called the General Register House (1787). The Register House serves the purposes of public house and make it possible to bring all national monuments, as well as accommodating the whole offices of record connected with the supreme court. The Lord Clerk Register and his deputies have now merely the custody of the records, their preparation being entrusted to another class of officers.

Under the Scottish records are included the Acts of Parliament and of Privy-council, and the records of the several courts of justice, including that of the Registre of the Great Seal, Privy Seal, and Signet. An important class of records are the Retours of Services. A service is by the law of Scotland, in cases of intestacy, necessary to transmit a right to real property to the heir from his ancestor. At present this service consists of the determination of the title of the county or the sheriff of Chancery; but the form in use till 1847 was by retour, a writing which contained the verdict of a jury returned in answer to a briefe from Chancery for finding the heir at the death of his ancestor. The register of retours contains services from 1545.

The registers connected with the transmission of heritable rights are even more important. After several unsuccessful attempts to introduce a system of registration, the Register of Sases was established by Act 1817, chap. 16. By the system then introduced, the Act was continued, and in detail, all instruments requisite to the transmission of real property must, in order to convert mere personal right into real right, be put on record for publication. Besides the general register in Edinburgh, there are registers in the various counties kept at their respective county towns; but any instrument might be recorded either in the particular or the general register. Volumes were issued from the General Register House to the local recorders of sasses, which, when filled, were returned to the General Register House. This arrangement was changed by the Lands Registration Act of 1868, providing for the entire discontinuance of the particular registers before the last day of 1871, and enacting that all writs of this class be thenceforth recorded in the general register in Edinburgh, which register is so kept that the writs applicable to each county are recorded in separate series of volumes. By means of the Register of Sasses any title to real property can be ascertained with certainty and precision, and may, if necessary, be traced back nearly three centuries. It is also obligatory to record in separate registers all instruments necessary for the constitution, transmission, and extinction of voluntary encumbrances. See Registration. This system, while confirming the credit of the proprietor, also operates in favour of the security of creditors.

There is a special Register of Entails, in which, in terms of Act 1865, chap. 22, deeds of entail must be recorded at the sight of the Court of Session. There are also the records of the various commissariats, which include testaments and other relative documents. The object of registration in all these cases is publication; but charters by subjects, dispositions, bonds, contracts, and other probative writs may, under Act 1898, chap. 4, be recorded in the Register of Deeds for preservation. A third object of registration is execution. Every deed constituting a personal claim of debt, or an obligation to perform some lawful pretation, if intended to be made the subject of personal diligence for payment or performance, must be registered previously to execution being issued on it. Calendars of state papers relating to Scotland preserved in the English Record Office have been recently published; while the publication of the Scottish records in the Register House has been going on at intervals since 1811. These include the Acts of Parliament, Register of the Great Seal, Register of the Privy-council, Exchequer Rolls, Accounts of the Lord High Treasurer, and other records.
RECOVERY

See Apthorp's Calendars of Ancient Charters (1774); Acts of the Parliaments of Scotland, vol. i. appendix to preface; Reports of the Public Record Commissioners; the Record Publications—preface to the earliest volume of each series.

Ireland.—Many of the records perished during the wars prior to the final reduction of Ireland, and those which survived these commotions were long exposed to mutilation and destruction from the unsatisfactory arrangements for their custody. A commission was appointed in 1849 for the preservation and arrangement with the Irish Records, whose labours, conducted with considerable success, were terminated by the revocation of the commission in 1850. In 1847 commissioners were again appointed to investigate the state of the records, in consequence of whose labours a bill for their custody was prepared, but afterwards abandoned. In 1857, however, the Public Records (Ireland) Act was passed, and from 1869 the Reports of the Deputy-keeper of the Irish Records have been annually published. These include some documents and calendars in their appendices, notably a calendar of "Plantis (plantar literae potae) from Henry VIII.

Three volumes of a calendar of the Irish Patent and Close Rolls were published in 1861-63; and some other publications, including volumes of facsimiles of national MSS., have been issued by the Irish Record Office. This department since its formation in 1869 has done a great work in the way of collecting records from various depositories and arranging and cataloguing them. The records are open to searchers on payment of fees, but the deputy keeper may dispense with the payment of fees in his discretion, and will accede to the public from the searchers' work. One important feature of the Irish Record Office is the collection of Parish Registers made under Acts 38 and 39 Vict. chaps. 59, and 39 and 40 Vict. chaps. 58. This is an example which should be followed in England.

Recovery. See ESTABLISHMENT, ARMY, REGIMENT.

Rectifying is a process applied to alcohol, chloroform, or other volatile liquid, by which the last traces of impurities are removed by distillation. Preparations of stills have been devised for this purpose, for further reference to which see DISTILLATION, and ALCOHOL.

Rector (Lat. 'ruler'), in the Church of England, is a clergyman who has the charge and cure of a parish where the titles are not impropriate, and who accordingly has the whole right to the ecclesiastical dues therein; where the titles are impropriate the person is a Vicar (q.v.). In the Episcopal Churches of the United States and (since 1890) Scotland all incumbents are called rectors. See also EDUCATION, and UNIVERSITIES.

Rectum, the terminal portion of the intestinal canal, named, from its comparatively straight course, the rectum (see DISENTERY), is the seat of (1) Stricture or Laceration, which may be either of a simple or malignant nature. Simple stricture consists in a thickening and induration of the submucous tissue, less often of the muscular or mucous coat of the rectum, so as to form a ring encroaching on the calibre of the tube. It is situated most often about an inch from the anus, and the contraction is so great and unyielding that it is often difficult to pass a finger through it. It may occur as the result of injury or operation, of old ulceration (e.g., from dysentery), of syphilis, or without ascertainable cause. The symptoms are constipation and atony, and often fever. It may be treated; the parts must be alternately moistened with the waters, which, if not liquid, are passed in a narrow, flattened, or worm-like form that is very significant of the nature of the case. In an advanced stage of the disease diarrhoea and prolapsus often supervene. However great may be the constriction from stricture, it must be altogether avoided. Soft and unirritating evacuations must be procured by such medicines as the concoction of sterculia combined with sulphur (see PILES), or injections of castor-oil or of tepid water. The diet should be regulated so as to assist the action of the medicines. Nutritious soups are serviceable, since, at the same time, they support the strength and leave little matter to be evacuated. Gradual dilatation by suitable bougies often gives great relief, but must be steadily persevered with, as the contraction is almost certain to recur. Malignant stricture, which is commonly associated with the stricterns, but sometimes to the epithelial form of cancer—is by no means a very rare affection. Until ulceration sets in the symptoms are like those of simple stricture, only exaggerated in degree; but afterwards there is a discharge of fetid mucous-purulent matter which is extremely troublesome. In this case the treatment can, in most cases, be only palliative. Sometimes, however, if the tumour is low down and localised it may be removed with at least temporary relief. If complete obstruction occur, or is threatened, the surgeon may resort to the formation of an artificial anus in the loin or groin as a last resource.

(2) Spasm of the sphincter ani muscle is characterised by extreme pain in the region of the anus, especially when an attempt is made to evacuate the bowels. The muscle contracts so firmly that the surgeon cannot easily introduce the finger into the rectum. The spasm may be caused by piles, by fissure of the anus, by ulceration of the rectum, and sometimes apparently by mere constipation. It is often relieved by the application of the belladonna ointment of the British Pharmacopoeia.

(3) Nostrums of the rectum. Some purgatives, or proctalgia, is sometimes met with, and is especially prone to attack adult men and women persons. It is usually relieved by the judicious use of aperient medicines and such treatment as is used for other forms of Neuralgia (q.v.).

(4) Pruritis ani, or itching of the anus, is a very common and extremely troublesome affection. Sometimes it depends on the presence of threadworms, of old piles, constipation, or some other local cause of irritation, while in other cases it is one of the manifestations of some constitutional condition. The treatment must depend upon the exciting cause. See works on the rectum by Allingham, Cripps, Henry Smith.

Recuver, a village of Kent, 1 mile from the sea, and 9 miles W. of Margate, with remains of the Roman station Requibium. Pop. 298.

Recusants, persons who refuse or neglect to attend at the worship of the established church on Sundays and other days appointed for the purpose. The offence as a legal one may be hold to date from the proclamation of 1652; but it was not punishable under the statutes against recusancy until the reign of Charles II.; 'recusants convic' who absented themselves after conviction; 'popish recusants,' who absented themselves because of their being Roman Catholics; and 'popish recusants convic' who absented themselves after conviction. Protestant dissenting recusants were
relieved from the penalties of recusation by the Toleration Act of 1 Will. and Mary, chap. 18. Catholics were partially relieved in the year 1791, and completely by the Emancipation Act of 1829.

**Red.** Most of the important red pigments have been already noticed. For Carmine and crimson lake prepared from cochineal, and also for the madder red, see L. 1830 to be the red earth, which oxide of iron is the colouring ingredient—viz. Indian red, Venetian red, and light red—are referred to under OCHRES. Vermillion (q.v.) is one of the finest and most beautiful reds. It has now been ascertained, however, that it is not always quite so permanent, at least as a water-colour pigment, as was formerly supposed. For house-painters' use this colour is often adulterated with red lead, which, though forming a useful paint for some common purposes, is fugitive. The substances used for dyeing textile fabrics red are noticed under the head DYING.

**Redan.** See FORTIFICATION, SEBASTOPOL.

**Redbreast** (*Erythaca rubecula*), a bird of the family Sylviidae, well known in the British Isles because of its very general distribution, its early and legendary associations, its conspicuous plumage, and the fact of its being resident. Its range is gradually extending northwards, and now it is found as far N. as Hejnoy, in Zealand, where in spring it is found on the island of Jan Mayen, in autumn it visits the Faroes, but it has not yet been recorded in Iceland. Southwards it breeds throughout Europe (but only locally in the south of Spain), in North-west Africa and the Canaries, Madeira, and the Azores; and in Asia in the Ural Mountains. In winter its migrations extend to the Sahara, Egypt, Palestine, and Persia. The red-breast, known familiarly as Robin or Robin Red-breast, is about 5½ inches long, olive-brown in colour on the upper parts; chin, throat, and upper breast reddish orange, bordered with bluish gray on the sides of the neck and shoulders; under parts dull white; bill black; legs and feet brown; the body fairly full and round, the legs slender. The female is usually but not always duller than the male. In habit robins are domineering and pug- nacious, and they hoard the most preferred plantations, but coming near dwelling-houses when forced by severe weather. Nesting begins in March. The nest of dead leaves, dried grass and moss, and lined with hair and feathers, is made in banks, hollow trees, and sometimes in strange and extremely uncomfortable situations. The eggs are usually seven, are usually white with light reddish blotches, or pure white. Two or three broods are produced in the season. In autumn the young are forced by their parents to migrate, and at this season there is generally a great influx of robins from the northern parts of the Continent, where they have been passing the summer. The food consists chiefly of insects and worms; often of berries and other fruits; and in winter bread-crumbs and scraps of meat. Its song is sweet and plaintive, but of little compass, and not particularly pleasant to the ear. The widely distributed robin of the United States and Canada is a Thrush (*Turdus migratorius*).

**Redcar,** a popular bathing-resort in the North Riding of Yorkshire, 10 miles by rail NE. of Middlesbrough. Its smooth, firm sands stretch 10 miles from the mouth of the Tees to Saltburn. Pop. (1851) 2918.

**Red Cedar.** See JUNIPER.

**Red Crag.** See FLIOCENE SYSTEM.

**Red Cross,** the badge and flag adopted by every society, of whatever nation, formed for the aid of the sick and wounded in time of war, recognised and authorised by the military author-

**Red Cross Society** has become a generic name for all such voluntary efforts, and exists in any one of them. For three centuries or more a medical service has been attached to armies, and was long thought sufficient for every emergency, but the revelations made during the Crimean war (1853-56) were terrible. The merciful mission of the Red Cross Nurse, Miss Nightingale, and her comrades, when bearing the losses by one-half, threw light upon shocking defects, and compelled the acknowledgment of want of organisation in everything connected with the health of the troops and care for the wounded. Nevertheless, when the war broke out (1839) in Lombardy similar indigence was apparent. Local complaints arose, but the first practical result ensued from the publication by M. Dunant of his *Souvenir de Solferino*. The account of this battle (June 24, 1859), which lasted fifteen hours and in which 300,000 combatants were engaged, was so heart-rending as to force public attention to the necessity for supplementing the medical and sanitary service by volunteer societies trained and organised in time of peace. The book was discussed at Geneva at a meeting of the *Société Genevoise d'Utilité Publique*, February 9, 1863, and it was decided to be the meeting-place of the Red Cross. An international conference was then convoked, which assembled at Geneva, October 26, 1863, and included among its thirty-six members delegates from fourteen governments and six associations. A proposed code of international conventions was discussed, the main recommendations agreed to were (1) the formation in each country of a committee to co-operate with the army sanitary service in communication with the government, and occupying itself in time of peace with preparing supplies of hospital stores, training nurses, &c., and during wars furnishing the same in aid of their respective armies, neutral nations being invited to assist such national committees; (2) the declaration of the neutrality of hospitals, of the officials of the sanitary service, of the unpaid nurses, of the inhabitants of the country, and of the wounded and the sick; (3) the convention of Geneva, embodying these resolutions, was signed at a second conference at Geneva in 1864 by twelve out of sixteen representatives there assembled, and it has since been acceded to by every civilised nation. International conferences have been held at Paris (when the convention was extended to naval warfare), Berlin, and Vienna, but the resolutions passed at Geneva have not been materially altered. The International Committee still continues at Geneva, as a centre of communication between belligerent states, facilitating the action of the different societies and the transmission of relief offered by neutrals. The English Order of the Hospital of St John of Jerusalem, the National Society for Aid to the Sick and Wounded in War, the Eastern War Sick and Wounded Relief Fund, the Stavros Fund, the Comité National de Secours aux Membres Blessés, the Russian, the Austrian, and the Austrian Summerl Vereniging are among the best known of the numerous Red Cross societies. The Red Cross Society in the United States, since June 6, 1900, is organised under a charter granted by the General Assembly of the Committee at Geneva publishes quarterly, since 1862, the *Bulletin International des Sociétés de la Croix Rouge*. See also The Red Cross: Its Past and
In most species of Cervus they are first slightly spotted with white. In the first year the young male has only a hint of antlers, in the second year only small unbranched beams; thereafter a title is gained each year. Nearly allied is the North American wapiti (C. canadensis), and there are closely related species or varieties in Persia, Caucasus, and Tibet. Baillie Grolleau in *Sport in the Alps* (1896) has much about red deer. See Deer, Deer Forests, Stag-Hound; Red Deer, by R. Jefferey (1884); and *The Red Deer*, by Macpherson and others ("Fauna and Feathers", Series 1896).

Redlees, a town on the borders of Stirlingshire and Warwickshire, stands on an elevation 15 miles SSW. of Birmingham by rail. Needles, pins, fish-hooks, and fishing-tackle are made extensively. Pop. (1851) 4902; (1861) 9691; (1871) 11,293.

Reddle, Raddle, or Red Chalk (Scot. ochil), an impure oxide of iron (ferric oxide) associated with various proportions of clay or chalk, or sometimes other substances. It varies greatly in hardness, some kinds being difficult to crush and others quite soft. In colour it passes from a pale brick-red to a tint occasionally nearly as bright as vermilion. It is found in many places abroad, and in England in Somersetshire, the Forest of Dean, and Wiltshire. It is found in France, and, of a quality valuable for polishing optical glasses, near Rotherham in Yorkshire. Some kinds of it are used for marking sheep, others for carpenters' and masons' pencils, and the timer qualities for artists' enamels. Red ochre is one of the varieties.

Red Earth, the name given to the reddish-brown or earthy which so frequently occurs in regions composed of limestones. This earth is the insoluble residue of these portions of the calcareous rock which have been dissolved by rain. Such red earths are of common occurrence in limestone caverns. See Cave.

Redemptionists, one of the names of an order of monks devoted to the redemption of Christian captives from slavery. They are more frequently called Trinitarians (q.v.).

Redemptorists, called also Ligurians, a congregation founded by St. Alfonso Liguori (q.v.).

Redesdale, the valley of the river Reid in Northumberland, extending almost from the Scottish border in a south-easterly direction for over 16 miles, until it opens up into the valley of the Tyne, the river on the North Tyne at Redesmouth. It is for miles a mere mountain vale, sloping upwards into bleak and dreary moorland, but it has a quiet beauty of its own that is not easily forgotten by the traveller. The river springs out of the Cheviot Hills, which lie athwart the head of the vale, and down its course from Carter Tern on the border lay one of the chief roads into England. Watling Street itself traverses its middle and upper part. Near the southern end of Redesdale is the famous field of Otterburn (q.v.), but 16 miles from the border, which point again is but 10 miles from Jedburgh. The men of Redesdale of old were brave and turbulent, and bore more than their share in Border feuds and forays. Redesdale gave from 1877 the title of earl to John Thomas Freeman Mitford (1835–86), who was son of the ex-Speaker, John Mitford (1800–65). First Baron Redesdale, and who himself from 1851 was Chairman of Committees in the House of Lords, and a determined enemy of change in ecclesiastical matters.

Redeswire, RAID OF THE, a battle fought 7th July 1675 close to the English border at the pass leading across the Cheviots into Redesdale, about 6 miles ENE. of Chesters in Roxburghshire. A number of Scots attacked an English force to avenge the slaughter of a countryman, but were
beaten back and on the point of being utterly routed, when the provost and townsmen of Jedburgh arrived hot from the 10 miles' march, and at once set on the enemy. The Englishmen were soon completely defeated, with the loss of several considerable prisoners. There is a proxy ballad on the subject in Scott's Border Minstrelsy.

Red-eye, or Rudd (*Leuciscus erythrophthalmus*), a fish belonging to the same genus as roach, chub, and minnow. It is common in lakes, slow rivers, and tanks, in many parts of Europe and in England. It much resembles the Roach (q.v.), but is shorter and deeper. It is richly coloured, the name Rudd referring to the colour of the fins, the name Red-eye to that of its iris. The fish is better eating than the roach, and sometimes attains a weight of 2 lb.

Redgrave, Richard, painter, born in London on 30th April 1804, in 1826 was admitted a student of the Academy, and was elected an A.R.A. in 1840, an R.A. in 1851. From 1847 onwards he took a prominent part in art instruction, and in 1857 was appointed Inspector-general of Art Schools, which office, with that of Surveyor of the Royal Pictures, he resigned in 1880, being then created a C.B. In 1882 he was placed on the list of retired academicians, and next year he ceased to exhibit, having since 1823 contributed 154 pictures to the Academy, besides forty sent elsewhere. He wrote, with his brother, *A Century of English Painters* (1866), and edited several valuable catalogues. He died 14th December 1888. See *Memoir* by his daughter (1891).

Reding, Aloys von, the famous champion of Swiss independence, was born in 1765, in the canton of Schwyz. After serving in Spain he returned to Switzerland in 1783. As captain-general of the canton of Schwyz he repulsed the French Republicans, May 2, 1798, at Morgarten. After the formation of the Helvetic Republic Reding was one of those who eagerly worked for the restitution of the old federal constitution. In 1802 he founded in the eastern parts of Switzerland a league, with the intention of overthrowing the central government. Reding went to Paris in order to gain over the First Consul, but failed. Till 1803, and again after 1808, he acted as Landammann or chief-magistrate of Schwyz. He died 5th February 1815.

Red-letter Days. See BLACK LETTER.

Red Liquor. See CALICO-PRINTING, p. 645.

Redoubt. See FORTIFICATION.

Redout Kalé, a fortified post on the Black Sea coast of Russian Caucasus, is situated in a marshy region at the mouth of a small river, about 10 miles N. of Poti. It was the chief shipping-place for Circassian girls to Turkey, and was captured by the British fleet in 1854.

Redpole. See LINNET.

Red River, the lowest western branch of the Mississippi, rises near the eastern border of New Mexico, flows eastward through Texas, forming the entire southern boundary of Indian Territory, thence south-east through Arkansas and Louisiana, and enters the Mississippi below 31° N. lat. It is 1000 miles long, and receives the numerous branches, the Washita (Ouachita) the most important. It is navigable for seven months to Shreveport (350 miles). A few miles above is the Great Raft, of driftwood, which formerly blocked up the river.

Red River of the North, a navigable river of the United States and Canada, rises in Elbow Lake, Minnesota, and near the southern borders of the Mississippi, and flows south and west to Breakirkirke, then north, forming the boundary between Minnesota and North Dakota, and so into Manitoba and through a flat country to Lake Winnipeg. Its course is 665 miles (293 in the United States). The Red River Settlement was the origin of Manitoba (q.v.). For the Red River Expedition, see CANADA, Vol. II. p. 695, and RIEL.

Red Root (*Craspedia*), a genus of deciduous shrubs of the natural order Compositae. The common Red Root of North America (*C. americana*), which abounds from Canada to Florida, is a shrub of two to four feet high, with beautiful thysuli of numerous small white flowers. It is sometimes called *New Jersey Tea*, an infusion of its leaves being sometimes used as tea. It serves also as an astringent, and for dyeing wool of a cinnamon colour. A Mexican species has blue flowers, and a California kind is used for evergreen hedges.

Redruth, a town of Cornwall, on a hillside (414 feet) in the centre of a great mining-district, 9 miles by rail W. by S. of Truro. It has a town Hall (1850), 14 handsome houses (1861), a miners hospital (1803), &c. William Murdoch (q.v.) here in 1792 first used gas for lighting purposes. Pop. (1851) 7093; (1871) 10,685; (1891) 10,324.

Red Sea. The Red Sea is an arm of the Indian Ocean, running north-west from the Gulf of Aden, with which it communicates by the Strait of Bab-el-Mandeb, 134 miles across. Its length is about 1200 miles, and its width in the central portion is between 100 and 200 miles, the greatest breadth being about 205 miles; it narrows towards the southern entrance, while in the north it is divided by the peninsula of Sinai into two gulfs, the Gulf of Suez, 170 miles long by 30 miles wide, and the Gulf of Akaba, 24 miles wide.

The Arabian coasts of the Red Sea are usually narrow sandy plains backed by ranges of barren mountains; the African coasts towards the north are flat and sandy, but farther south high table-lands rise some 1000 feet in elevation, culminating still farther south in the lofty mountains of Abyssinia. A marked feature in the configuration of the Red Sea is found in the large existing and upraised coral-reefs running parallel to both the eastern and western shores, these being more extensive and farther from the coast than those to the west; the most important are the Farisan Archipelago in the eastern reef, and the large island of Duilah, lying off Annessley Bay, in the western reef. In addition to the islands of organic formation mention may be made of the volcanic group, which lies in 14° N. lat. of which, Jebel Zurgar, is 10 miles long, 7 miles wide, and 2074 feet in height; farther north, on the islet of Jebel Teir, is a volcano which was active until quite recently. A dangerous reef, the Desalnus, lies directly in the path of steamers in 24° 15' N. lat., and a lighthouse has been placed on it. The principal harbours on the Red Sea are Mocin, Hodeida, Lokeyyadh, Jiddah, and Yembo on the Arabian coast, and Massowah, Khor Nowarat, and Snakim on the African coast.
In ancient times the Red Sea was used as a means of communication by the Phenicians and other maritime peoples, until the discovery of the route round the Cape of Good Hope diverted the traffic into another channel, only to be revived, however, on a much more extensive scale with the construction of the Suez Canal.

The tides are very variable, depending largely on the direction and force of the winds, which also to a great extent determine the direction and velocity of the surface currents. The hot climate is due to the almost cloudless sky, and consequent want of rain, the altitude of the sun, and the absence of rivers. The mean temperature of the air generally ranges between 70° and 94° F. during the day, though readings of over 100° are often registered in the shade; but during the night the temperature may fall to the freezing-point, owing to radiation in the clear atmosphere. The prevailing wind on shore is north-north-west almost universally, but from October to May south-south-east winds prevail over the southern portions of the sea, a belt of calms and variable winds occurring in the central part of the basin in the latter season; the usual north-north-west winds are met with. Evaporation is very great, and the air over the water is always very moist in the summer; hurricanes are unusual, but rain-showers frequently occur with the southerly winds, and moderate gales and sandstorms, called 'dragons' in the popular language of the Arabs, are not uncommon.

The mean temperature of the surface water in the Red Sea varies at the northern end between about 63° and 79° F., in the central regions between 71° and 89°, and at the southern end between 75° and 90°; readings of over 100° have been recorded at the southern end of the sea. The temperature of the water below the surface decreases down to a depth of about 200 fathoms, from whence down to the bottom a mean temperature of about 71° is found all the year round; this agrees with the temperature conditions prevailing in the enclosed seas of the East Indies, for instance, according to the observations made on board the Challenger, the depth at which the minimum temperature occurs (i.e. 200 fathoms in the Red Sea) indicating the depth of water over the barrier separating the Sea from the open ocean. Below 200 fathoms in the northeastern part, the whole body of water from surface to bottom usually has a mean temperature of 71°.

The salinity of the water is almost constant at about 1.030 (ordinary ocean water is about 1.026), and this is due to the fact that no rivers flow into it, little rain falls, and the evaporation is excessive. It has been estimated that, were the Red Sea entirely enclosed, it would become a solid mass of salt in less than two thousand years, but this is prevented by an inflow of water through the Strait of Bab-el-Mandeb, and it is also known that a current of water from the open ocean flows out underneath the incoming surface current.

The greatest depth in the Red Sea is about 1200 fathoms, and the mean depth of the whole area about 375 fathoms. From the point of greatest depth, which is near the centre, the bottom rises towards each end. Owing to the absence of rivers the deposits approach in character those formed in the open ocean, being largely composed of Foraminifera, Pteropods, and other pelagic shells. The marine fauna and flora are extensive, and have been described by Haeckel and other naturalists; it has been shown that migrations of the Red Sea and Mediterranean fauna is taking place along the Suez Canal. The origin of the name—the Lat. Mare Rubrum and the Gr. Ergythra Thalass—is much disputed. The Hebrew name is Yam Neqat, which Gesenius explains as the 'sea of reeds.' The path by which the Israelites went out of Egypt was along the course of the valley called Wady Tumeilat, apparently an old arm of the Nile now silted up. The Lake of Ismaeliah (Timsak) was then most probably the head of the Gulf of Suez, but the exact point of passage of this arm of the sea still remains obscure.

Redshank. See Sandpiper.

Redstart (Ruticilla phoenicura), a bird of the family Sylviidae, ranging in Europe from the North Cape to the wooded regions of central and southern Europe; in Asia to the valley of the Yenesi in summer, and to Palestine, Arabia, and Persia in winter; in Africa from the Canaries and Madeira and Senegal to Abyssinia in winter. In Great Britain it is a summer visitor to most parts, though unaccountably absent from some; in Ireland it has been very seldom recorded, but since the summer of 1885 it has nested annually at Power's Court, County Wicklow. The male is about 5½ inches long, has the head, back, and wing-coverts slate-gray; the forehead and eye-streak white; chin, throat, and cheeks jet black; wings brown, with pale outer edges; the tail and upper tail-coverts bright rufous chestnut; the rest of the under parts buff; bill black; legs and feet brown. The female has the upper parts grayish brown, under parts lighter, the tail less brilliant, and no bright colours on the head. The redstart is a bird of lively manners. Its food consists of flies, gnats, small butterflies, and other insects; the young are fed largely on caterpillars. The nest is built of moss and dry grass, lined with hair and feathers, in holes in trees or walls; the eggs are usually six in number, and of a light blue colour. The song is slight, but soft and melodious; the alarm note is a plaintive sweep. In some parts of the country this bird is called the 'Fire-tail,' start being derived from the Anglo-Saxon stewt, 'a tail.' The Black Redstart (R. iligus) is now a well-known visitor to many parts of the English coasts, especially of Devon and Cornwall, in autumn and winter, and also to the east and south coasts of Ireland. It is more rare in Scotland, but it has been found as far north as the Pentland Skerries. It has been recorded in Iceland, the Færoes, southern Scandinavia, and Denmark. From Holland southwards it is almost always breeding. There are other species of redstart, one (R. mosulensis) in Cyprus, Asin Minor, and Persia; another (the Indian Redstart, R. rubrifrentis) from Lebanon eastward; and a third (R. ochrurus) in the Caucasus and Armenia.

Redwing (Turdus iliacus), a species of Thrush (q.v.), well known in Britain as a winter bird of passage. It spends the summer in the northern parts of Europe and Asia; it occurs in Iceland, and struggles even to Greenland; its winter range extends to the Mediterranean, Persia, Northern India, and Siberia as far as Lake Baikal. In size it is somewhat smaller than the song-thrush or mavis. Its flight is remarkably rapid. The general colour is a rich clove-brown on the head, upper parts of the body, and tail; the wing-feathers darker, but with lighter external edges; the lower parts mostly whitish, tinged and streaked with brown; the under wing-covers and axillary feathers bright orange. The reedwing arrives in Britain rather earlier than the Fieldfare (q.v.), and, like it, congregates in large flocks, but is less numerous and less gregarious. Its food consists of insects, small snails, and berries. It has an exquisite, clear, flute-like song, which it pours forth from the summit of a high tree, gladdening the woods of the north.

Redwood. See Pine.

Reed, the common English name of certain tall grasses, growing in moist or marshy places, and having a very hard or almost woody culm. The Common Reed (Phragmites communis, formerly Arundo Phragmites) is abundant in Britain and continental Europe, in wet meadows and stagnant waters, and by the banks of rivers and ditches. It grows chiefly in rich alluvial soils. The culms are 5 to 10 feet high, and bear at the top a large, much-branched panicle, of a reddish-brown or yellowish colour, having a shining appearance, from numerous long silky hairs which spring from the base of the spikelets. The two outer glumes are very unequal; and the spikelet contains 3 to 4 perfect florets, with a barren one at the base. The culms, or stems, are used for making garden-screen{s, for light fences, for thatching houses and farm-buildings, for making a framework to be covered with clay in partitions and floors, for battens of weavers’ shuttles, &c. So useful are reeds in these ways, and particularly for thatching, that it is found profitable in some places to plant them in old clay-pits, &c. Probably they might be planted with advantage in many pastures where they are now unknown. The plant is not very common in Scotland; but in the fenny districts of the east of England it covers large tracts called red-rooms, and similar tracts occur in many parts of Europe. Nearly allied to this is Arundo donax, the largest of European grasses, plentiful in the south of Europe, and found in marshy places as far north as the south of the Tyrol and of Switzerland. It is 6 to 12 feet high, and has very thick, hollow, woody culms, and a purplish-yellow panicle, silvery and shining from silky hairs. The woody stems are an article of commerce, and are used by musical instrument makers for reeds of clarinets, mouth-pieces of oboes, &c. They are also made into walking-sticks and fishing-rods; and see the article Writing. The creeping roots contain much farina and some sugar. Of Arundo Karka (called Sur in Sind) the flower-stalks are very fibrous; and the fibres, being partially separated by beating, are twisted into twine and ropes. The Sea Reed is Ammophila (q.v.)—or Gymno—arundinacea.

Reed. in Music, the sounding part of several instruments, such as the clarionet, bassoon, oboe, and bagpipe, so called from its being made from the outer layer of a reed (Arundo activa or donax) found in the south of Europe. The name is also applied to the speaking part of the organ, though made of metal. Reeds are generally divided into two kinds—the beating reed, used in the organ, clarionet, &c., requiring to be placed within a tube to produce a musical sound, and the free reed, used in instruments of the harmonium and concertina kind. The Organ (q.v.) reed (fig. 1) consists of a metal tube, a, with the front part cut away and having a metal (brass, German-silver, or steel) tongue, b, covering the orifice, attached at the upper end, and bent forward at the lower end to permit of vibration. The admission of a current of air to the outer tube causes the tongue to vibrate against the edge of the opening in the tube a, producing a musical note, the pitch of which is determined by the length of the free end of the reed;

![Fig. 1](image1)

![Fig. 2](image2)
centre. The air being blown into the thin end causes the two reeds to vibrate against one another. The free reed, shown in fig. 3, consists of a metal tongue, b and a flexure of one end, c, of a metal plate, a, having an elongated slot large enough to allow the free end of the tongue to vibrate freely through it on the admission of a current of air; and this vibration forms the note, the pitch of which is regulated by the length of the reed.

Reed Bird. See Bob-o-link.
Reed Mace. See Typha.
Reef. See Coral.
Reel, a lively dance, popular in Scotland, which makes use of two couples, but admits a greater number. The music is in general written in common time of four cotchets in a measure, but sometimes in jig time of six quavers.

Reels. See Bobbins.
Rees, Abraham (1743–1825), a native of Montgomeryshire, and Unitarian minister for forty years at the Old Jewry, London, compiled an Encyclopaedia (q.v.) on the basis of Eqn. Chambers'.
Reeve (Sax. gerefa), a title applied to several classes of old English magistrates over various territorial areas: thus, there were borough-reeves, over boroughs; port-reeves, in trading-towns, in ports, as in London (q.v.); high-reeves, &c. The Sheriff (q.v.) is the shire-reeve. The reeve in Chaucer's is what is still called grieve in Scotland, a land-steward.

Reeve, Clara, novelist, daughter of the rector of Preston in Suffolk, was born at Ipswich in 1729, lived a quiet life, and died unmarried, 3d December 1903. She translated Barbery's Arégnes (1772), and in 1777 published the Champion of the British, a Gentleman of Fashion, a year later The Old English Baron. It was dedicated to Richardson's daughter, and was avowedly an imitation of Walpole's Castle of Otranto, with its extrava-gances toned down. She published four other novels, and The Progress of Romance (1755).

Reeves, J. J., was born in 1752, and educated at Merton College, Oxford. Called to the bar about 1780, he became chief-justice of Newfound-land (1791–92), one of the king's printers (1800), a superintendent of aliens (1803–14), and law clerk to the Board of Trade, and died in 1829. He published much on law, and a widely popular edition of the Bible, with selected scholars (9 vols., 1827).

Reeves, John Sims, one of England's greatest singers, was born at Shooter's Hill, Kent, on 26th September 1818. At fourteen he was a clever performer on various instruments, and was appointed organist and director of the choir in the church of North Cray in Kent. He first appeared in public as a baritone at Newcastle in 1839. This début was a complete success; and he acquired fresh fame, but as a tenor, in London. In order to perfect his voice and style he studied at Paris (1843) for some time, and then appeared at Mihau in the tenor part of Edgardo in Lucia di Lammermoor. He returned to England in 1847, and, coming out at Drury Lane as Edgardo, was immediately recognised as the first English tenor, a position he maintained for many years. He was engaged in 1848 at Her Majesty's Theatre, and in 1851 sang as first tenor at the Italian Opera in Paris. After ceasing to sing on the stage (after 1860) he became popular all over the country as a ballad-singer at concerts. He especially excelled in singing oratorio parts, his first oratorio rôle having been in Judas Macca-beus in 1844; from that year onwards he sang almost regularly at the great annual musical festivals which were then held, and he displayed natural purity and sweetness. He made his last appearance on 11th May 1891, and died at Worthing, Sussex, 25th October 1900. See his My Jubilee (1889), and the Life by Sutherland Edwards (1881).

Reflection. See Monastery.
Refertud. See Switzerland.
Reflection, A surface on which a beam of light falls may be either rough or smooth. If it be rough, the greater part of the incident light is irregularly scattered by the irregularities of the surface, so as to be reflected or dispersed in all directions; if it be smooth, a proportion (but never the whole) of the incident light is regularly reflected or turned back in definite paths. A smooth, dustless mirror is not visible to an eye outside the track of rays reflected from it. If the surface and the air be of a transparent substance (e.g. glass) optically denser than the medium conveying the light to it, comparatively little light is reflected; but the more oblique the incidence, the smoother the polish, and the greater the difference between the optical density of the glass and that of the air (which is usually the case), the more of the beam is reflected. If the index of the glass is 1·5 and that of the air 1·0, the reflection is 84 per cent; if the index of the glass is 1·5 and that of the air 1·3, the reflection is 63 per cent. If the glass is 1·0 and the air 1·5, the beam is transmitted, the glass being optically rarer than the air. A beam of light striking an optically denser medium is refracted into the denser medium, but if it be transmitted, the beam is again reflected on the other side of the glass, and on returning to the denser medium is refracted again to its former position; thus the beam is continually reflected and refracted at the surface between the two media. If the glass be of a medium of the same index as that of the air, the beam is transmitted through the glass, and not reflected. On the other hand, if the glass be of a medium of the same index as that of the air, the beam is transmitted through the glass, and not reflected. If a beam of light be incident on a semi-transparent medium at any angle, the beam is divided into two parts; one part is transmitted through the medium, and the other part is reflected at the surface of the medium. The fraction of the beam which is reflected is called the reflectance of the surface, and the fraction of the beam which is transmitted is called the transmission of the surface. If a beam of light be incident on a semi-transparent medium at any angle, the beam is divided into two parts; one part is transmitted through the medium, and the other part is reflected at the surface of the medium. The fraction of the beam which is reflected is called the reflectance of the surface, and the fraction of the beam which is transmitted is called the transmission of the surface. The reflectance of a surface depends upon the angle of incidence, and for all but a very small angle is equal to the angular reflectance. The angular reflectance is equal to the angle of reflection (the corresponding angle between the normal and the reflected ray). These laws apply equally to ether-waves of all lengths, and therefore to light of all colours; and they also hold good whatever be the shape of the surface. If the surface be plane, the rays of the reflected beam are all parallel; and if the surface be curved we have, in effect, to consider the curved surface as made up of indefinitely small facets, to each of which the above laws can be applied. The geometrical consequences of these laws make up what we call the catoptrics, that part of geometrical optics which deals with reflection; and this coincides in its propositions with the laws of the refraction of light, and it gives us a complete theory of the phenomena of light.
with that part of kinematics which gives an account of the reflection of waves. Here the ether-waves (using the term 'waves' in its most general sense) are assumed to travel through optically homogeneous media, and can consequently be traced out by imaginary lines drawn at right angles to the wave fronts or along the directions pursued by the waves, these imaginary lines being called 'rays.'

**Plane Reflecting Surfaces.**—(1) Rays which are parallel to one another before striking a plane reflecting surface are parallel after reflection. (2) If light diverging from or converging towards a point, Q, be reflected from a plane mirror, it will appear after reflection to diverge from or converge towards a point, q, situated on the opposite side of the mirror and at an equal distance from it. In fig. 1, the rays diverge from Q; after reflection they appear to diverge from q. If, on the other hand, the course of the light is such that the rays appear before reflection to converge upon q, they will after reflection diverge from Q. (3) A consequence of the preceding proposition is that when an object is placed before a plane mirror the virtual image is of the same form and magnitude as the object, and at an equal distance from the mirror, on the other side of it. The right hand of the image, taken as looking towards the mirror, is necessarily opposite to the left hand of the object; so that no one ever sees himself in a single plane mirror as others see him or as a photograph shows him, but he sees all his features reversed. (4) When two mirrors are placed parallel to one another, light from an object between them is reflected back and forth, so as to appear on each occasion of reflection as if it came from images more and more remote from the mirrors. On each occasion the course of the ray of light is the same as if the virtual image behind the mirror had been a real object; and a new virtual image is produced, apparently as far behind the reflecting mirror as the virtual object had been in front of it. Thus, in fig. 3, where AB and CD are mirrors, the distance Q-CD = CD-q1; q1-AB = AB-q2; and so on indefinitely; and also Q-AB = AB-q; q'-CD = CD-q'; and so on indefinitely; so that if the mirrors were perfectly plane and parallel, and if they reflected all the light inclined at an angle which is some aliquot part of 180°, gives the principle of the Kaleidoscope (q.v.). (5) When a beam of light is reflected from a mirror and the mirror is turned through a given angle the reflected beam is swept through an angle twice as great. This property is utilised in the construction of many scientific instruments, in which the reflected beam of light serves as a weightless pointer, and enables us to measure the deflection of the object which carries the mirror. (6) When a beam of light is reflected at each of two mirrors inclined at a given angle the ultimate deviation of the beam is (if the whole path of the light be within one plane) equal to twice the angle between the mirrors; for example, in fig. 4, the angle SDB, which measures the ultimate deviation of the original beam SA, is easily proved equal to twice the angle BCA between the two mirrors. This proposition is applied in the Quadrant (q.v.) and in the Sextant (q.v.). (7) When a wave of any length is reflected at a plane surface it retains after reflection the form which it would have assumed but for the reflection, this form being, however, guided by reflection into a different direction.

**Curved Reflecting Surfaces.**—In these we have to trace out the mode of reflection of incident rays from each 'element' or little bit of the reflecting surface; and this leads, through geometrical working, to such propositions as the following: (1) Parallel rays, SP, travelling parallel to the axis of a concave paraboloid mirror (fig. 5) are made to converge so as all actually to pass accurately through F, the geometrical focus of the paraboloid; and, conversely, if the source of light be at F, the rays reflected from the mirror emerge parallel to one another—a proposition of great utility in light in the work, search-lights, &c. (2) If the paraboloid mirror be convex, parallel incident rays have, after reflection, the same course as if they had come from the geometrical focus of the paraboloid. (3) In a concave ellipsoid mirror, light diverging from one 'focus' of the ellipsoid is reflected so as to converge upon the other 'focus' of the curved surface; and by a convex ellipsoid mirror light converging towards the one focus is made to diverge as if it had come directly from the other focus. (4) In a hyperboloid reflector the two geometrical foci have properties corresponding to those of the ellipsoid. (5) In spherical reflectors, which are those most easily made, there is no accurate focus except for rays proceeding from the centre and returning to it. When parallel rays are incident on a
converging spherical mirror we see from fig. 6 that if they be parallel to the axis, the reflected rays are made to pass after reflection through a point, q, which is nearer to F (a point midway between the mirror and its centre, O) the narrower is the pencil of rays. If, therefore, the pencil of rays be very narrow in comparison with the radius, OA, the rays will after reflection be approximately converged upon F, which is called the principal focus of the mirror; and the principal focal distance, AF = tAO = yr, where r is the radius of the spherical mirror. The farther any ray is from the axis AO, the farther from F is the point, q, to which that ray is reflected; the difference, pq, is called the longitudinal aberration for that ray. The reflected rays from the various parts of the mirror form by their intersection a Caustic (q.v.), the apex or cusp of which is at F.

If, instead of using a parallel beam of incident light, we have light coming from a point at a definite distance along the line of sight, we find (see fig. 7) first that any ray from Q to A travels back along AO, whence the focus of reflection is coincident with the point AO; and that any ray, QP, is reflected to a point, q, such that the angle QPQ = qPO; and therefore (since by Euclid, vi. 3, QO = qO) QP = qP. If the pencil be relatively very narrow, so that QP becomes equal to QA, and qP to qA, we have QO = qO: QA = qA. This proportion reduces to the equation 1/Aq + 1/AQ = 2/AO; whence we can readily find Ay when AQ and AO are known. Thus, if, for example, the radius of curvature AB be 12 inches (the principal focal length being then 6 inches), and if Q be 30 inches from A, we have 1/Aq + 1/30 = 2/12; whence 1/Aq = 8/60 and Aq = 74 inches. The same formula may be written 1/d + 1/d' = 1/f, where d and d' are the distances from A of the two 'conjugate' foci, pq and q, and f is the principal focal length. The two 'conjugate' foci are reciprocal; if light start from q it will be reflected to Q. As Q, the source of light, approaches Q, q also approaches Q; when Q is at 0, q also is at 0; as Q continues to move towards F, q moves out more and more rapidly beyond Q, until when Q is at F, q is at an infinite distance, or the reflected rays are parallel; when Q is between F and A the reflected rays are divergent, as if from a virtual focus on the opposite side of A. If the mirror be convex, fig. 8 shows that AO and AQ have, with respect to the surface, opposite signs; so also have AO and AQ; so the equation above becomes 1/Aq + 1/AQ = 1/AO; whence, taking the same numbers as before, Ay is equal to or 5 inches; a virtual focus lying to the right 5 inches from a point 5 inches on the other side of the reflecting surface.

As to the quality of the light reflected there are some peculiarities to be observed. From the surface of a transparent body, of greater optical density than the surrounding medium, light polarised in the plane of incidence and reflection is more largely reflected at oblique incidences than light polarised at right angles to that plane; when the angle of incidence is such that the reflected and refracted rays tend to be at right angles to the whole of the plane of incidence. Light reflected is polarised in the plane of incidence and reflection; and if light polarised at right angles to that plane be made to fall upon glass at the particular angle of incidence just referred to, it will not be reflected at all, but will wholly enter the glass. Plane-polarised Light polarised in some other plane than that of incidence or one at right angles to it, is, after total reflection in glass, found to be elliptically polarised (see POLARISATION); and this phenomenon is always presented in reflection from metals. In the case of electro-magnetic phenomena light is polarised in consequence of the electric and magnetic forces concur in indicating that conductors are good while non-conductors are bad reflectors; and the same general proposition holds with reference to those more frequent but otherwise similar ether-oscillations to which the phenomena of Radiant Heat, Light, and Electricity are due.

**Reflex Action.** See Nervous System.

**Reform** is a comprehensive name for those changes in the law by which the House of Commons has been made a truly representative body. In the 18th century the only elections were in county elections; in many boroughs the franchise was restricted to members of the corporation; boroughs of this class were usually under the influence of the crown or of some wealthy individual who regarded them as a part of his property. In 1745 Sir F. Dashwood moved an amendment to the address, claiming for the people the right to be freely and fairly represented; in 1766 Lord Chatham took up the cause of Reform; Wilkes proposed an excellent scheme of redistribution in 1776; in 1780 the Duke of Richmond proposed annual parliaments, and electoral districts, but his plan met with no support. Pitt entered public life as an avowed reformer, and in 1783 he introduced a measure of redistribution; the part of his scheme most open to objection was the proposal to compensate owners of rotten boroughs. His bill was rejected, and he dropped the subject. The king was pressed to change, and in the public mind reform came to be identified with the revolutionary opinions which were beginning to prevail in France. Fox and Grey kept alive the demand for a wider franchise and a better distribution of power. In 1815 the Whig friends of reform found an able leader in Lord J. Russell. His first motion on the subject was proposed in 1820, and in 1830 he accepted office under Lord Grey. A Reform Bill was brought in, and the second reading was carried by a majority of one. A subsequent defeat in committee compelled the government to dissolve. The country declared unmistakably for Lord Grey; his second Reform Bill was passed in the Commons by a large majority. It was rejected by the Lords, and the same fate would have befallen a third bill introduced in 1832, but at the request of the Lords the king declared the threat to create as many new peers as might be necessary to pass the bill. After something like a century of discussion the first Reform Act received the royal assent. The greater part of the labouring classes were still unenfranchised; the Radical reformers continued to agitate; the Whigs and Tories were unwilling to disturb the settlement of 1832. Agitation was stimulated by the so-called People's Charter put forth in 1838; but it was not till 1832 that Lord J. Russell reopened the question of Reform. Successive governments continued to consider it, and after 16 years past, Lord Derby and Mr Disraeli succeeded in passing the act by which household and lodger franchises were extended to the boroughs. In 1884 Mr Gladstone proposed to assimilate the franchise in counties to
that which had been given to the boroughs; but the Lords refused to pass any bill for ending the franchise until the details of the government scheme of redistribution were before them. The action of the Lords led to considerable agitation in the autumn recess. The bill was re-introduced in an autumn session; and the question at issue between the two Houses of Parliament was whether the government should accept a compromise with the subjects, or whether it should reject all compromise and persevere in its programme. The government agreed not only to communicate their plan of redistribution to the leaders of the opposition, but to settle the details by mutual arrangement; Lord Salisbury and Sir S. Northcote attended meetings of the cabinet, and conferred with ministers for this purpose. The results of this conference were embodied in a series of bills which were passed into law before the general election of 1885. Two points in the measures of 1884–85 have been somewhat severely criticised—the adoption of single-member districts, and the office of Municipal Register, which suppresses the opinions of all local minorities (see REPRESENTATION), and the addition of twelve members to the House of Commons, which was already too large a body for deliberative purposes. At the end of the reign of George III. there were, in a population of 22,000,000, only 440,000 voters. The Reform Bill of 1832 added less than 500,000 voters to the electorate; the reform of 1867–68 increased the electorate from 1,136,000 to 2,445,000. At the passing of the measures of 1884–85 the electorate had by natural growth risen to about 3,000,000; and the Act of 1884 added at once about 2,000,000 more to the list of voters. Of the new electors, about 1,300,000 were in England and Wales, 200,000 in Scotland, and 400,000 in Ireland.

See the articles Parliament, Chartism, Gladstone, Russell (Earl); Monarchical History; and the speeches of Gladstone, Bright, Disraeli, &c.

Reformation. The religious revolution of the 16th century, known as the Reformation, is the greatest event in the history of civilization since Paganism gave place to Christianity as the faith of the leading nations of the world. It marks the supreme importance of this revolution that the age which preceded and the age which followed it belongs to two different phases of the human spirit. With the Reformation begins what is distinctively known as Modern Europe, while the epoch that precedes it bears the distinctive designation of the Middle Ages. As a revolution in which all the countries of western Europe were more or less directly involved, the subject of the Reformation has necessarily been treated in the different accounts of these countries. In the articles on Luther, Charles V., Henry VIII., Calvin, Knox, and others further details will be found regarding the aims and methods of the revolution in the various countries where it declared itself. Here, therefore, it will be sufficient to indicate briefly the general causes which produced it, the special countries which took an active part, the different peoples, and its chief results for the human spirit at large.

The central fact of the Reformation was the detachment from papal Christianity of the nations disposed to follow Germany into Protestantism. By this severance an order of things came to an end under which Christian Europe had been content to exist from the close of the 8th century. From the year 800, when, by a mutual understanding of their respective functions, Charlemagne was crowned emperor of the Romans by Pope Leo III., western Europe had come to regard the papacy as the essential condition of individual and corporate life, as prime a necessity in human affairs as the sun in the course of nature. Thus conceived, the power of the church underlay all human relations. It was the consecration of the church that constituted the family; the church defined the relations of rulers and their subjects, and the church was the final court of appeal on the ultimate questions of human life and destiny. In the nature of things such a power could never be realised as it was ideally conceived. Yet during the 11th and 12th centuries, the period when the power of the church was at its height, works were put forward to show that the claims, they undoubtedly went far to make the idea a reality. But the energies of the human spirit were bound sooner or later to issue in developments with which medieval conceptions were fundamentally irreconcilable. By the 13th century, along every line of man’s activity, there were already protest, conscious and unconscious, against the system typified in the pope at Rome. The most remarkable of these protests was the order of ideas associated with the name of John Huss of Flora in Calabria (died 1419). Under the name of the ‘Eternal law’ (letter by James Tyrie, a Scottish Jesuit) claims John of Flora as an ally in the work which it was the labour of his own life to achieve—the ruin of the papacy, and the promotion of what he deemed a purer gospel.

Simultaneously with this manifestation of revolutionary energy there was another movement in the sphere of pure thought in essential antagonism to the teaching of the church. The labour of the thinkers of the middle ages was to reconcile faith, as incarnated by religious authority, with human reason as they found it embodied in the accessible writings of Aristotle. In the 13th century, however, the Arabic texts of Aristotle, and notably that of the great commentator Averroes, made their way into the Christian schools, and thenceforward a leaven of scepticism was a present element in all the universities of Europe. As the result of the teaching of Averroes, a name of the most sinister import to every true son of the church, materialism and pantheism became common creeds among thinkers, and the notion spread even among intelligent laity that Christianity was not the absolute truth, but a vehicle for them to believe. In Dante’s (died 1321) fierce exclamation that the knife is the one reply to him who denies the immortality of the soul we have the outburst of a passionate faith in presence of a widespread libertinism of thought.

But the most serious menace against the integrity of the papal system lay in the political development of Europe during the last three centuries of the middle ages. As the countries of western Europe became more and more individualised, their peoples grew every year into a fuller consciousness of distinct national interests and national ideals. While
The very zeal with which the revival of antiquity was pursued in Italy was itself a countercheck to religious reform in the country that of all others needed it the most. All contemporary literature proves that during the later part of the 15th and the opening of the 16th century, there was as profoundly immoral as that of any of the heathen emperors that had been in the same city. The spiritual claims of the papacy were the jest of ecclesiastics themselves. 'This fable of Christ,' a certain dignitary of the church is reported to have said in Italy, 'has been to us a source of great gain.' Among the Italian people, however, there was never the slightest indication of a national movement towards any serious breach with the papacy. The religious melodrama enacted by Savonarola at Florence (1497-98) never struck at the central ideas of papal Christianity; and Savonarola, besides, never like Luther or Knox woke a deep response in the national consciousness. While in Italy, therefore, there was no widespread religious quickening as in other countries of Christendom, there was no political movement which in any way produced such a profound effect with the papacy. For the Italian people the pope was not a foreign prince with temporal interests of his own conflicting with those of the nation at large. The different republics which partitioned the country might at times regard the papal territory as a menace to their own supremacy, but the nation as a whole was fully conscious of the honour of having the vicar of God in their midst, and as in the past they had stood by him against the emperors, so in the great religious revolution of the 16th century they also remained faithful to him through the gradual dismemberment of his spiritual dominion.

Of the countries north of the Alps Germany was the first to be widely influenced by that revival of learning which had its origin in Italy. In Germany, however, the new spirit sought under fundamentally different conditions, and lighted the way to vastly different issues. There was every reason why Germany should lead the way in the schism from Rome. Outside Italy Germany was the country where every abuse of the medieval clergy was felt with the deepest audacity. The ignorance and sensuality of the clergy, the scandalous sale of livings, the disproportionate papal exactions—all these evils came to be vividly realised by the quickened consciousness of the nation. Between Rome and Germany, moreover, an antagonism existed in the very conditions from which mediavilism had sprung. It was in virtue of the mutual understanding between pope and emperor that the church came to fill the place it did in western Europe. But almost from the first the interests of Rome and the empire had been in collision, so that pope and emperor came to be mere rivals for the first place among the western powers. It was natural, therefore, that in Germany Rome should be regarded with a jealousy and suspicion which might easily grow into irreconcilable hostility.

These workings of the national mind found intensified expression in the acts and writings of Martin Luther, who, with a genius and audacity which have given him a place among the moulders of man's destinies, proclaimed the need of a new departure in the religious life of humanity. In rejecting the exercise of spiritual disintegration, the two results of the revival of the ancient literatures. In so many words he states his grave fears lest the church should be wholly pagannised by the universal imitation of classical modes of thought and speech; while his own unswerving criticism of the church and its traditions proves how much he owed to the so-called 'new learning.'
the Reformation and new elements in the life of European nations.

The religious revolt in Switzerland is second only to that of Germany in its direct influence on the subsequent fortunes of the European nations. In Switzerland we have the case of a double revolt from Rome springing from the same conditions, yet each having a character and an animating soul of its own. The first was the attempt to renew, independently of Luther, Ulrich Zwingli, who, according to Ranke, combined in himself the best elements of renaissance and reform, gave rise to a movement which split the Swiss cantons into two hostile sections, and issued in the peace of Coipel (1538), by which the Swiss Cantons, never in the choice of its own form of faith. More important than the movement of Zwingli at Zurich is that associated with Calvin and Geneva. As in almost every other case of revolt, political considerations wrought with religious zeal in the breach of Geneva with Rome. In 1536 the town had received the new religion from French refugees, who thus gave its peculiar character to the creed eventually associated with Calvin and Geneva. But it was in the successful effort of the town in throwing off the yoke of the Catholic Dykes of Savoy (1534) that it found itself forced to join the great Protestant schism, and to fashion a civil and religious polity compatible with an independent corporate life. It was in the accomplishment of this task that Calvin proved himself the great consolidator of the ten- dency to political freedom. Inspired by Calvin, it was the pre- eminent destiny of Geneva at once to produce a reasoned civil and religious creed and a type of Christian believer that offered a solid front against the vast powers still at the command of the Roman see, and most drastic measures against it. By the end of the 16th century, also, the Renaissance, which was everywhere the solvent of tradition, had found its

with pope and priest, and in this had lain the essential principle of medieval Christianity. By the new principle Luther made the pope no longer an indispensable factor in individual or corporate life, and thus initiated a new phase in the development of society. As was to be expected, this principle, which was so revolutionary in its working, came the German nation in twain, and gave rise to a struggle which did not close till more than a century after the death of Luther himself. Luther’s attack on the sale of indulgences (1517), the burning of the papal bull (1520), Luther’s condemnation (1521) by the Emperor of the Church of Worms (1521), his temporary triumph at the first diet of Spires in 1526 (the beginning of modern Germany, according to Ranke), the confession of the Protestant faith at Augsburg (1530), are the outstanding events in the contest closed by the peace of Augsburg in 1555, nine years after Luther’s own death, but again renewed in the disastrous Thirty Years’ War (1619-48), and finally settled by the peace of Westphalia (1648).

The religious revolt of Germany led no country of Europe. But the 16th century had closed the bulk of the Teutonic peoples had followed her example and broken with the papacy. Under one aspect, indeed, the Reformation may almost be regarded as a Teutonic revolt against the domination of the Latin races. Between 1525 and 1555, in nearly every section of the dominions of a political revolution, both declared for Prot- estants; and in 1581 the United Provinces definitively threw off their double allegiance to Spain and the pope. But it is more important to trace the course of the revolution in the great powers of the West. In Spain heresy of all kinds had no chance of finding a home. In its terrible Inquisition, re- organised in 1478, it had an institution ready made for effectually dealing with all attempts at reform or revolution. Luther found followers in Spain as in other countries; they were literally extin- guished before their voices could be heard, and of all the great powers Spain profited least by the quickening spirit of the Reformation.

Much more interesting and important is the history of the religious revolt in France. Between 1529 and 1530, the period of Luther’s greatest activity, both renaissance and reform found a firm footing in France, and so many circumstances seemed to favour the future of both that for a time it was doubtful which side the victory would eventu- ally befall. The University of Paris, which throughout the middle ages had claimed for itself the right—denied to the pope himself—of sovereign decree on the truth or falsity of all religious doctrine. As its decrees had in every case the strenuous support of the parliament of Paris, the university was a formidable force to be reckoned with by every innovator in studies or religion. In 1519 Luther’s dispute with Eck had been referred to the doctors of Paris for decision, and their judgment, delayed for two years, had been the unqualified censure of Luther’s position. Thus Luther was the only standard of the true religion and they daily grew in numbers, especially among the middle class, both in Paris and in the provinces, was pursued by the unrelenting hate of the parlia- ment and the university. On the other hand, the king himself (1521) permitted that his favorite sister, Marguerite de Navarre, who herself had strong Protestant leanings, was at first disposed to use the new religious movement as a weapon to his hand in his dealings with the court of Rome. In the end Francis saw that separation from Rome meant the disruption of the French nation, and after 1534 he resolutely set himself to the exter- mination of every heretic in his dominions. His son and successor, Henry II. (1547-50), carried out this policy with even greater rigour, but in spite of all efforts to suppress them the French Protestants grew into a body formidable alike by their position, wealth, and intelligence. The Huguenot wars, the Massacre of St. Bartholomew (1572), the Edict of Nantes (1598) are the outstanding events in this long struggle, which, involving political as well as religious questions of the first importance, threat- ened the very existence of France by suggesting to Philip II. the possibility of annexing the divided country as a base for a European conquest. Under the Edict of Nantes the French Protestants attained a certain measure of religious freedom; by its revocation in 1685 Protestantism was stamped out of the country, and France thus deprived of the noblest elements in its society.

The religious revolution in Switzerland is second only to that of Germany in its direct influence on the subsequent fortunes of the European nations. In Switzerland we have the case of a double revolt from Rome springing from the same conditions, yet each having a character and an animating soul of its own. The first was the attempt to renew, independently of Luther, Ulrich Zwingli, who, according to Ranke, combined in himself the best elements of renaissance and reform, gave rise to a movement which split the Swiss cantons into two hostile sections, and issued in the peace of Coipel (1538), by which the Swiss Cantons, never in the choice of its own form of faith. More important than the movement of Zwingli at Zurich is that associated with Calvin and Geneva. As in almost every other case of revolt, political considerations wrought with religious zeal in the breach of Geneva with Rome. In 1536 the town had received the new religion from French refugees, who thus gave its peculiar character to the creed eventually associated with Calvin and Geneva. But it was in the successful effort of the town in throwing off the yoke of the Catholic Dykes of Savoy (1534) that it found itself forced to join the great Protestant schism, and to fashion a civil and religious polity compatible with an independent corporate life. It was in the accomplishment of this task that Calvin proved himself the great consolidator of the ten- dency to political freedom. Inspired by Calvin, it was the pre- eminent destiny of Geneva at once to produce a reasoned civil and religious creed and a type of Christian believer that offered a solid front against the vast powers still at the command of the Roman see, and most drastic measures against it. By the end of the 16th century, also, the Renaissance, which was everywhere the solvent of tradition, had found its
representatives in England. Linares, Grocyn, Colet, and Sir Thomas More were all men more or less emanated from medievalism, though none of them was a universalist. But both Colet and Colet spoke their minds freely on the unhappy lives of the clergy; and the latter by his foundation of St Paul's School in 1510, and by his placing it under lay supervision, took a step of the highest importance in the direction of the new order. But it is in the political development of England that we find the adequate explanation of her final breach with Rome. For centuries the pope had come to be more and more regarded as a foreign prince, whose powers, as he claimed the right to exercise them over Englishmen and English places, were opposed to the highest interests of the nationality and English liberty. Moreover, by the date of Henry's accession the pope was a mere Italian prince, whose own interests led him to seek the support of the strongest arm. When Clement VII, therefore, declared against the divorces from Catherine, Henry regarded the decision not as the oracle of Christendom, but as the counsel of an earthly prince whose own interests left him no other alternative.

The breach with Rome was thus inevitable; but it still remained to be settled whether the old or the new ecclesiastical government should control the English people. Henry himself to the close of his life professed to have broken with the old only in the point of the headship of the church. In the reign of Edward VI a clear departure was made from the doctrinal system of the ancient church; but the temporary reaction under Mary showed how strongly the hold system still possessed on the hearts of the people. When Elizabeth came to the throne in 1558 it was only her prudent policy that saved the country from the interlaced divisions of France and Germany. Three parties were equally bent on realising their own conceptions of a religious settlement. The adherents of the old religion, who still probably made a half of the people, had not lost hope of a return to the old spiritual allegiance. Those who had renounced the papacy themselves made two distinct parties, each bent on the establishment of a new form of worship. Thus it was for the first time that they could never work in common. The governing principle of the one party, from which eventually sprang the Church of England, was to minimise the differences between the old faith and the new, and as far as possible to maintain the continuity of the religious traditions of the country. The other, which drew its inspiration from Calvin and Geneva, and was afterwards known as the Puritan party, aimed at a root and branch rejection of papal Christianity as at once in the interest of what they thought a purer creed, and as the only safeguard against a return to the old constitution. It was owing to her politic handling of these conflicting parties that at Elizabeth's death England was of one mind regarding the question of the papal supremacy, and that the severance from Rome became a definite fact in the development of the country. By happy turns of events, such as her excommunication by Pius V. in 1570, and by the extraordinary issue of the Spanish Armada in 1588, not only was the number of Catholics reduced, but such as still clung to the ancient faith thenceforward put their allegiance to their national Church. It was this final triumph of the Protestant revolution in England that saved the movement in all the other countries of Europe.

The triumph of the Protestant movement in Scotland is likewise a fact of the first importance in European history. In Scotland, from the very beginning of Luther's revolt, we find the presence of the same elements which elsewhere led to revolution. As in other countries, the Scottish clergy had lost the respect of the country. As early as 1525 Lutheran books were so widely read that an excommunication was no adequate sentence for their importation. The very efforts of the church to stamp out the new heresy, as in the burning of Patrick Hamilton in 1528, and of George Wishart in 1546, served only to hasten the turn of affairs which it had dreaded. Jealousy of the wealth and political influence of the clergy disposed the nobility to throw in their lot with the party of revolution. When in 1559 Knox returned from his long sojourn abroad, his unflinching zeal and personal force supplied the momentum that was needed to complete a revolution already in full progress. The strong interest which Protestantism was formally established as the religion of the country. The consequences of this revolution extended far beyond Scotland. Had Mary on her return in 1561 found Scotland united in the Catholic faith, she would have commanded the destinies of England. Elizabeth could never have effected a religious settlement, and, with England paralysed, Protestantism could not have held its own against the united forces of Catholicism.

Thus, by the middle of the 16th century, it seemed as if the revolution must sweep all before it, and the papal system be as completely effaced by Protestantism as Paganism had been effaced by Christianity. At the beginning of the revolt the authorities of the ancient church did not fully realise that the forces arrayed against them menaced their very existence. When the true extent of the danger was realised the church displayed all the resources of an institution whose roots were in the very heart of Christendom, and which, alike by its traditions and by its special adaptations to the wants of the human spirit, appealed to the deepest instincts of a large section of all the peoples of western Europe. The Society of Jesus, founded in 1540, supplied an army of enthusiasts, whose policy and devotion saved Rome from dissolution. By the decree of the Council of Trent (1545-63), inspired by the spirit and aims of the Jesuits, the Roman Church undertook to teach, conceding nothing either to renaissance or reform; and a succession of popes during the later half of the 16th century carried out with a zeal worthy of the better ages of the papacy the policy marked out for them by the Jesuits. Throughout the greater part of the country where the Counter Reformation was most strenuous efforts of the papacy, the middle of the 16th century saw the tide of revolution checked; and in certain countries, more especially in Germany, the Jesuits even gained ground which had been lost. By the close of the same century Europe was partitioned between the two religious almost by the same dividing lines as exist at the present day.

It has been said that the central fact of the religious revolution of the 16th century was the secession of the Protestant nations from the Roman see; but the great schism inevitably led to issues of which the Protestant reformers never dreamed, and which they would have denounced in as unqualified terms as any theologian of the medieval church. The reform of religion preached by Luther or Calvin implied no real change in the modes of thought and feeling of the people. The reformation of scholasticism was but another form of scholasticism; their attitude to the classical tradition or to any departure from their own conception of the scheme of things was precisely that of the Schoolmen trained on the Decretals and Aristotle. For an attitude which was their own unerring expression of God's relations to man; the interpretation of the Bible they left to the indi-
vital consciousness. This freedom was of necessity only nominal, since the members of any Protestant church were members only on condition of their accepting the church's interpretation of the contents of the Bible, and since each different church deemed itself the special depository of the only true conception of the perfect will of God. Nevertheless, it was in the middle of the 18th century that the spirit of the Reformation was applied to the middle ages. In the medieval conception church and state made one organism; what menaced the life of the one menaced the life of the other. Hence the state had to be in charge of the prison. It was only in the 18th century that anything resembling a reformatory was established. The 19th century, however, was one of rapid and far-reaching changes in the whole system of government and administration; and the new ideas could not be expected to be put into operation only in obedience to the political views of the day. But the new system could not be made to suit the existing views. The older system of imprisonment and the system of transportation were both abolished. The new system was one of reform, and the reformatory system was a part of it. 

Reformatory and Industrial Schools. When the time arrived that statesmen and reformers combined to study the causes of crime with the view to systematic efforts for its repression, it soon became evident that the most effective method would be to check the first development of it in the young. Close observers agreed in the fact that by far the larger number of habitual criminals commenced their malpractices before they were seven years old, and nearly 60 per cent. when under fifteen. Hanging and imprisoning did not check the growth of the class of juvenile criminals. In the early part of the 19th century there were said to be in London two hundred flash houses frequented by 6000 boys, the majority of whom were not even acquainted with the Bible that the developments of modern thought sprang from. A reformer like John Knox would have stamped out every form of thought hostile to his own synthesis of things divine and human; but it was not in the nature of the Reformation to have been so effectually done by the church of the middle ages. In the medieval conception church and state made one organism; what menaced the life of the one menaced the life of the other. Hence the state had to be in charge of the prison. It was only in the 18th century that anything resembling a reformatory was established. The 19th century, however, was one of rapid and far-reaching changes in the whole system of government and administration; and the new ideas could not be expected to be put into operation only in obedience to the political views of the day. But the new system could not be made to suit the existing views. The older system of imprisonment and the system of transportation were both abolished. The new system was one of reform, and the reformatory system was a part of it. 

Reformatory and Industrial Schools. When the time arrived that statesmen and reformers combined to study the causes of crime with the view to systematic efforts for its repression, it soon became evident that the most effective method would be to check the first development of it in the young. Close observers agreed in the fact that by far the larger number of habitual criminals commenced their malpractices before they were seven years old, and nearly 60 per cent. when under fifteen. Hanging and imprisoning did not check the growth of the class of juvenile criminals. In the early part of the 19th century there were said to be in London two hundred flash houses frequented by 6000 boys, the majority of whom were not even acquainted with the Bible that the developments of modern thought sprang from. A reformer like John Knox would have stamped out every form of thought hostile to his own synthesis of things divine and human; but it was not in the nature of the Reformation to have been so effectually done by the church of the middle ages. In the medieval conception church and state made one organism; what menaced the life of the one menaced the life of the other. Hence the state had to be in charge of the prison. It was only in the 18th century that anything resembling a reformatory was established. The 19th century, however, was one of rapid and far-reaching changes in the whole system of government and administration; and the new ideas could not be expected to be put into operation only in obedience to the political views of the day. But the new system could not be made to suit the existing views. The older system of imprisonment and the system of transportation were both abolished. The new system was one of reform, and the reformatory system was a part of it.
REFORMATORIES AND INDUSTRIAL SCHOOLS

for its being removed to such school if not originally committed to it. No school can be compelled to receive a child. The selection of the school is in practice generally a matter which the governor of the prison arranges with the managers after the sentence of the child, and with the consent of the local authority, has a general agreement with some school.

A reformatory may be established wholly by private individuals, or by quarter sessions in counties, or by town-councils in quarter sessions boroughs, or by private individuals with contributions from local authorities. The state provides no reformatories, and the local authorities are not obliged to do so. Plans of any buildings proposed to be used as a reformatory must be submitted to and approved by the Secretary of State. The rules of such reformatories must be laid on the managers, but must be submitted to and approved by the Secretary of State. The expenses of maintaining the reformatory are met partly by private contributions, partly from local rates, partly from funds provided by the Treasury, and partly by pay-roll expenses of the parents. The latter is the largest item of expense. In 1890, the cost of the reformatory schools was £2619. The following is a list of the reformatory schools in Great Britain, including fifteen ships, and these ten were in Scotland. There were seven in Ireland.

The reformatory system in Great Britain is the following. In 1856, twenty-nine children were committed to reformatory schools in England; in 1857, 1304; in 1877, the largest number recorded—viz. 1890; and in 1890, 1290. The total population of the reformatory schools in Great Britain seems to have risen gradually until 1881, when it attained its maximum—viz. 6738; since which it has fallen gradually, and on 31st December 1890 there were under detention 5031 males and 823 females, or together 5854, of whom 4164 males and 737 females were actually in the schools, the remainder being mostly on furloughs. In 1881, 528 had absconded, or were in prison. The cost of these schools in the latter year was £119,336, of which £78,802 was provided by the Treasury, £5488 by the parents, £24,035 by local rates, £2793 by subscriptions and legacies, £799 by voluntary associations, and £2019 interest on local and industrial school funds. The remaining balance of expenditure over receipts of £5519; and, as the inspector's report shows that there was a profit on industrial operations of over £13,416, it is presumed that the deficiency was supplied from that source. The net cost per head in 1890 was £7, of which 28p 3½d. was by the Treasury, 23p 2½d. by the parents, 13½d. by the local rate, 5½d. by subscriptions and legacies, 4½d. by voluntary associations, and 1½d. 3¼d. by the local industrial schools. The number of inmates under detention in 1890 was 5673, of whom 4250 were boys and 1423 were girls. The number of admissions exceeds the number released, but the difference is mostly due to the partial discharge of boys before the age of fourteen, and cannot be detained above the age of sixteen. The circumstances which justify a magistrate committing a child to an industrial school are—If he has been found begging, wandering without settled abode or proper guardianship, and manual work, and who is destitute, an orphan, or having a surviving parent in prison, whose mother has been twice convicted of crime; or if the child under twelve is charged with a punishable offence, but has not previously been convicted of a felony, and in any case must be sent to a reformatory on the application of its parent or guardian; a reformatory pauper child, or one either of whose parents has been convicted, may also be sent to an industrial school.

The Education Act, 1876, requires the school authority to take all necessary steps to arrange that the attendance of all boys and girls who are liable to be sent for the above reasons, unless it is in any case inexpedient, and further requires it to apply to justices for orders compelling the attendance of children over five and under fourteen whose education is substantially neglected by their parents, and authorises the commitment of such children to an industrial school.

Day industrial schools, in which, as their name implies, children can be trained and fed, but not lodged, were authorised by the same act. The number of children committed to these industrial schools for the industrial school, consists of two cases, and a child may be licensed from an industrial school as from a reformatory. So also are the provisions for meeting the expenses of these schools. The report for 1890 of the inspector of reformatory and industrial schools shows that all are now in Great Britain 141 industrial school for board cases, and 388 industrial school for school board cases, and 19 day industrial schools. Of these 7 are established by county authorities, 1 by the corporation of Birmingham, and school boards manage 6, besides the truant schools and day industrial schools.

The following table shows the number of children by the number under detention in each year to be in the direction of steady increase. In 1864, 1668 children were under detention; in 1890 this had risen to 22,735. These figures include the truant schools, but do not include the day industrial schools, which commenced in 1872 with 287 scholars, and in 1890 had 3698. The number of admissions corresponds in steadiness of increase with the foregoing figures. In 1861, 608 boys and 406 girls were admitted; in 1862, 422 boys and 169 girls; in 1866, the year of the consolidated act, the numbers rose to 1444 boys and 539 girls; and in 1890 there were 3438 boys and 849 girls, besides 1510 to truant schools, and 2317 to day industrial schools. (A small deduction should apparently be made from these figures for transfers.) The foregoing figures giving the number under detention in various years which These schools, of which the Trustees contributed £104,405; the rates, £4,198; school
boards, £67,036; the parents paid £16,656, and subscriptions provided £4,489. The cost of day industrial schools rose from £3272 in 1879 to £6,538 in 1890. Of this latter sum the average for the United Kingdom was £1,271 per school, £11,960, and parents, £3,382. The total ordinary cost of a child in an industrial school ranges from £14 to nearly £18 per annum.

The statutes in force for regulating reformatory and industrial schools in Ireland differ somewhat from those in force in Britain, and in Ireland more children in proportion to population are sent to industrial schools than in Great Britain, so that the Royal Commission in 1848 reported: "It is certain that the certified industrial schools in Ireland are regarded as institutions for poor and deserted children rather than for those of a semi-criminal class, and the result of this feeling is that the managers of many of these institutions refuse to take children who have been found to have committed a criminal offence, and who might legally be convicted of that offence and sent to a reformatory. All taint of criminality having been removed from the schools, numbers of children are sent to them who do not always come under the provision of the act, and who are sent merely on the ground of destitution. There can be no doubt that many children are sent to the industrial schools in Ireland who would not be so sent in England; whilst in consequence of it it is to be apprehended that numbers of children who are proper subjects for these institutions are left on the streets as waifs and strays." There were, in Ireland, at the end of 1890, 816 children on the lists of reformatories or industrial schools (a decrease as compared with the previous year), of whom 744 were actually in school. There were 8909 children on the rolls of the industrial schools (an increase on the previous year), of whom 7767 were actually in school—the remainder mostly on license. The nominal cost in Ireland was £17,190 in 1890, of which imperial taxes bore £11,890, local taxes £5318; and the industrial schools, £158,274, of which imperial taxes bore £95,842, local taxes £57,262, a decrease of cost compared with the previous year for reformatory schools of £23,700.

The most famous of the continental reformatories is that at Mettray, about 5 miles from Tours. The 'Colony,' as it was called, was established in 1839 by M. DeNizet, a French magistrate and philanthropist, in conjunction with the Vicomte Bretonniere, and the charities are 800—either orphans, foundlings, or delinquents—are taught and employed in agricultural and various industrial labours. The release into crime of those who have left the colony have amounted only to about 4 per cent. In the United States there are nearly fifty reformatories for juvenile offenders under the control of a state or city, with an average number of inmates exceeding 12,000; and the reformatory results attained are excellent. The New York House of Refuge, which dates from the year 1824, is the oldest in the United States; the reformatory for juveniles in the world which was established by law and placed under legislative control. Desti-

Reformation. See ClUes, and L. Fa gan's *Reformation School (1881).*

Reformed Churches. A term employed in what may be called a conventional sense, not to designate all the churches of the Reformation, but those in which the Calvinistic doctrines have been more the Calvinistic polity prevail, in contradistinction to the Lutheran (q.v.). The influence of Calvin proved more powerful than that of Zwingli, which, however, no doubt considerably modified the views prevalent in many of these churches. The Reformed Churches are generally known on the continent of Europe as the Calvinistic Churches, whilst the name Protestant Church is in some countries almost equivalent to that of Luther.

One chief distinction of all the Reformed Churches is their doctrine of the sacrament of the Lord's Supper, characterised by the utter rejection not only of transubstantiation, but of consubstantiality; and it was on this point, mainly, that the controversy between the Lutherans and the Reformed was long carried on. See Lord's Supper, and SACRAMENT. They are also unanimous in their rejection of the use of crucifixes, and of many ceremonies retained by the Lutherans. Churches belonging to the Reformed group are those of England (in some respects) and Scotland, some churches of various parts of Germany, the Protestant Churches of France, the Netherlands, Switzerland, Hungary, Poland, &c., with those in America which have sprung from them.

See the articles Confessions of Faith, Articles, Prayer-Book, Luther, Zwingli, Calvin, Knox; and works on the distinctions between Lutheran and Reformed Churches by Schweitzer (1856), Heer (1857), Merle d'Aubigné (1861), Schmeckebier (1855).

Reformed Presbyterians. See CAMERONIANS.

Refraction. When a beam of light, travelling in a transparent medium, impinges obliquely upon the surface of another transparent medium, what occurs in the vast majority of cases is that a part of it is reflected (see REFLECTION) and a part of it enters the second medium, but in so doing it is refracted or bent out of its former course. If, for example, the light travels in air and impinge obliquely upon glass, the course of the refracted portion is bent so that the refracted light travels more directly or less obliquely through the glass; and, conversely, if the light impinges upon the air-surface, the portion which is refracted into the air will travel through the air more obliquely with respect to the refracting surface than the original light had approached it. The law of refraction was discovered by Snell in 1621, and is the following: the refracted ray is in the same plane with the incident and the reflected ray, and is therefore in the plane of incidence (see REFLECTION); and the sine of the angle of incidence bears to the sine of the angle of refraction a ratio which remains constant, for any two media, whatever be the angular incidence. In fig. 1 a ray, AO, impinges on a denser medium at O; the angle of incidence is AON (ON being at right angles to the refracting surface); the refracted ray, instead of going on towards A', is bent so as to pass through A. If AON is the angle of incidence and O'A' the angle of refraction, then sin A' = cos A; draw ec and ed' at right angles to NN'; these lines, cd and c'd', are, for the radius Oe, the sines of the respective angles AON and A'ON. These sines bear to one another a certain proportion, ascertainable by measurement; let it be 3:2; the law is that when the incident ray is refracted from B, will be so refracted that the sines, similarly drawn, will bear to one another the same proportion of 3:2. Between air and water the ratio of these sines is almost exactly 4:3; between air and
crown-glass it is nearly 3:2. Now observation shows that light passing from water into crown-glass is so refracted that the sines have the ratio $\frac{4}{4}$, or $9:8$, so that the rays are less bent than when they pass from air into any of these media.

Fig. 1.

The ratio of these sines when air is one of the pair of media involved is called the refractive index of the other medium; thus, water has, for sodium, monochromatic light and at 18° C. a refractive index of 1.3336, and crown-glass one of 1.5396; and the ratio of these refractive indices, ascertained with respect to air, governs the ratio of the sines, whether air be one of the pair of media experimented on or not. A direct consequence of this is that, if light pass successively, say, through air, glass, and water, the ultimate deviation will be the same as if the glass had been absent; and so for any number of intervening terms, it being always assumed that the bounding surfaces are parallel to one another; and if a parallel beam of light, passing through air, come to traverse any number of parallel refracting-surfaces, and if it regain the air, it will be found to travel parallel to, if not directly in, its original course.

The observed fact that light is differently bent in its course by different refracting media shows that there is a difference between bodies in their power of receiving light through their bounding surfaces. Newton, in accordance with his corpuscular theory (see Light), interpreted this as showing that when the luminous corpuscles come very near the surface of a denser substance they are as it were jerked or made to swerve out of an oblique path and hurried in by the attraction of the denser substance so as to enter that substance more directly; and that when the light quits the denser substance it is retarded by a similar attraction. The consequence of this would be that light would travel in the denser medium perhaps not appreciably faster than in air, but with a mean velocity certainly not less. On the undulatory theory, however, refraction is a necessary consequence of a slower travel of ether-disturbances in the denser medium.

In fig. 2 A is a plane wave-front, advancing obliquely towards B, the surface of a denser medium. At the end of a certain time the wave-front is at A'; after an equal interval it is at A". During the next equal interval a gradually diminishing breadth of the wave is traversing the original medium with the original velocity; but a steady widening portion of the wave-front enters the denser medium and is there hampered. At the end of the interval the aggregate disturbance, that is to say, the wave-front, will be found to have swung round into the position and direction represented by $\alpha$, just as a line of soldiers would tend to do on obliquely entering more difficult ground. During the next equal interval the wave-front advances parallel to itself, but traverses smaller distances in equal times, so that $\alpha\alpha'$ is less than $A'A"$. To this explanation it is essential that in optically denser media light should travel more slowly; and it has been absolutely established that this is the case. Optical density, so called, does not, however, always coincide with mass-density: bismuth of carbon, which is lighter than glass, has for sodium light a refractive index of 1.63, while crown-glass has an index about 1.5, and flint-glass one about 1.6. If the course of any ray between any two points in the two respective media be studied, it will be found that no other path between the two points could have been traversed in so short a time.

If we go back to fig. 1, and assume the rays to pass from $A', B', \&c.$ towards O, we find the rays emerging from the denser medium more nearly parallel to $SS'$; a ray from $C'$, so far as it is refracted at all, emerges parallel to $SS'$; and for rays approaching O from points between C and $S'$ the construction for the refracted ray becomes impossible. The angle $C'O'N$ is the critical angle, beyond which there is no refraction, but total reflection (see Reflection). This angle is such that its sine is equal to $\frac{1}{\mu}$, where $\mu$ is the ratio between the refractive indices of the denser and the rarer medium. For water and air it is, for sodium monochromatic light, 48° 27' 40". Where this ratio $\mu$ (the "relative index of refraction") is high, this critical angle is small and total reflection is well marked, as in the sparkle of the diamond.

When a spherical wave impinges on a plane surface it is modified into a hyperboloid, the centre of curvature of the central portion of which is farther away than or nearer than the centre of the sphere in the ratio of the refractive index of the second medium to that of the first. An eye within a rarer medium will thus see the image of a point situated within the denser medium as if it were nearer than it really is; hence a stick appears bent when partly immersed obliquely in water; and, owing to differences in the amount of refraction at different angles, the bottom of a tank looked down upon appears sunk in the middle.

In fig. 3 light starts from a point $X$, and impinges directly upon a spherical surface of a denser medium; the centre of curvature of the spherical surface is at C. During a certain interval of time the front of the wave advances from $A'$ to $A$; during the next equal interval it would, but for the denser
medium, have been at BRD. It has not, however, got so far as R in the time; the central part of the wave-front has only got as far as R', where AR : AR' = μ : 1. Any non-axial ray, such as XP, which would have reached Q, can only have originated a disturbance at P, which would have travelled from P in some direction to a distance not equal to PQ, but to PQ reduced in the same ratio of \( \mu : 1 \). We might then, knowing \( \mu \), the relative index of refraction of the denser medium, draw, with centre P and radius = PQ + \( \mu \), an arc of a circle; the disturbance will have got to some point on that circle. Doing the same for all the P's, we have a series of circular arcs which may be connected by a line drawn so as to touch them all. This line will be a curve; and it will, for some distance from the axis, coincide very nearly with the arc of a circle whose centre is at X', so that the wave-front will travel in the denser medium approximately as if it had originally come from X'. The relation between the distances AX, AX', and \( \mu \) is given by the formula

\[
\mu = \frac{AX'}{AX} = \frac{\mu_0}{\mu_1} / AC, \quad \text{where } \mu_0 = \text{the refractive index of the original, and } \mu_1 = \text{the refracting medium.}
\]

For example, let \( \mu_0 = 5 \) (air) and \( \mu_1 = 1.5 \) (crown-glass); AC = 2 inches; AX = 1 inch (i.e. the source of light is one inch to the left of A). Then

\[
\frac{AX'}{AX} = \frac{1}{2}; \quad \text{whence } AX' = 2, \text{ the light travels in the denser medium as if it had come from a point 2 inches to the left of A. If the wave-front be plane as it approaches A, that is equivalent to } AX = \infty \text{ or } \mu_0/AX = 0; \quad \text{whence } AX' = \text{equal to } + 6, \text{ or the light converges on a point in the denser medium 6 inches to the right of A.}
\]

If the plane wave-front approach A in the denser medium, that is equivalent to \( AX = \infty \); but, as the original medium is now the denser one, \( \mu_0 = \frac{1}{2} \) and \( \mu_1 = 1 \); whence, by the formula, \( AX' = -4 \), and the convergence is on a point 4 inches to the left of A. These distances of the points of convergence for plane waves, at

\[
\sin \theta = -4 \quad \text{and} \quad +6
\]

from A, are the Principal Focal Distances for the curved surface and the media in question; and they bear numerically the same ratio to one another as the refractive indices do; from which, together with the previous example, we may infer that the focals for an axial ray, \( AX = 1 \); which shows, still keeping to our numerical example, that when the object lies at a greater distance than 4 inches to the left or 6 inches to the right of A, the image is a real one on the opposite side of A; when it is at a loss distance from A, X and X' are on the same side of A, and the image is virtual. X and X', thus determinable when one of them is known, are conjugate foci; and they are interchangeable, so that an object at either will produce an image, real or virtual as the case may be, at the other.

The refracting medium may not be of indefinite extent, but may be bounded in the path of the light by another surface. If this be symmetrical with respect to the first spherical surface we have a lens; and then, by repeating our calculations of the refraction at the second surface as if the image produced by the first were itself an object, we arrive at the formulæ given in the article on Lenses.

If a parallel beam of light enter one plane surface and be there refracted and emerge by another which is not parallel to the first, we have the essentials of a Prism. Assume the incident light to be monochromatic; then fig. 4 shows the incident beam SP taking the equation, on the figure, of SPQR. The elements of the problem are, \( \mu \) being the relative index of refraction of R the prism: (1) \( \mu \sin QP' = \sin SP' \); (2) \( \sin PFQ' = \sin RQm \); (3) angles \( \sin QP' \); (4) angles SP' + RQm = angles A + m \( \sin \mu \), last being the Deviation produced by the prism. These four equations contain seven terms; and it is sufficient to measure three of these, say the angles A, SP, and m \( \sin \mu \), in order to ascertain the rest, including \( \mu \), the relative refractive index of the prism, for a monochromatic light employed. If, however, the light employed be not monochromatic but mixed, as ordinary daylight, we find that the prism sends each wave-length—each colour-sensation-producing component of the daylight (see Colour)—to a different place, and thus produces a Spectrum (q.v.). Each wave-length has its own \( \mu \) and its own deviation; the more rapid, shorter waves being the more refrangible by a given piece of glass.

If in fig. 4 the prism be turned so that S and R lie symmetrically with reference to the angle A, the deviation is then a minimum; and in that position of minimum deviation a monochromatic beam, divergent from S, will come to focus at R. In examining the spectrum of light from a source S it is necessary to turn the prism so as to ensure the narrowest beam, by producing this minimum deviation for each part of the spectrum in succession. When the deviation is a minimum everything is symmetrical; SP = RQm; QP' = PQ'; whence, by equations above, SP' = \( \frac{1}{2} (A + m \sin \mu) \), and QP'' = \( \frac{1}{2} \); whence \( \sin \theta = \sin \frac{1}{2} (A + m \sin \mu) + \sin \frac{1}{2} \), which determines \( \mu \) when the angle of the prism and m \( \sin \mu \) have been measured. The refractive indices of liquids and of gases are determined by enclosing them in hollow prisms of glass whose walls are made of truly parallel glass; the parallel glass produces no deviation. In liquids the angle of total reflection or critical angle may also be readily measured; then the sine of this angle is \( 1/\mu \). The refractive index varies with changes of density, \( \mu - 1 \) being approximately proportionate to the density; and it bears certain intimate relations with the molecular constitution of the body of the prism.
yellow, while it absorbs the rest. Further, it is found that in these cases of anomalous dispersion the substance generally has in the solid form a surface-colour different from that seen through its solution; and there are always absorption-bands, on the red side of which the refrangibility is increased, while on the other side it is diminished, as if the molecules themselves took up oscillations of particular periods and hurried on the propagation of slightly slower or retarded that of slightly more rapid oscillations of the ether. It appears as if this kind of action were never wholly absent; the spectrum produced by a prism never wholly coincides with the diffraction spectrum in which the deviation for each wave-length depends directly upon the wave-length itself; and the spectrum produced by a prism say of crown-glass does not exactly coincide in its visible distribution of colours with a spectrum of equal length made by a flint-glass prism. This is called the Irrationality of Dispersion. If now we take two prisms, such as C (crown-glass) and F (flint-glass) in fig. 5, and pass a beam of light through; then, if the angles of these prisms be suitable, the rays dispersed by the one will be collected by the other, and there will on the whole be deviation without dispersion; but not absolutely so, on account of the irrationality of dispersion of both prisms, the effect of which is that a calculated ratio of angles and refractive indices which will cause deviation without dispersion for any given pair of wave-lengths will, to a very slight extent in most cases, fail to do so for the other wave-lengths present in the mixed light transmitted through the system. By the use of three prisms three wave-lengths may similarly be abeamatised.

**Double Refraction.**—The wave-surface developed when a disturbance originates at a point in a homogeneous medium, like glass, is spherical in form. In uniaxial crystals (see Crystallography) the disturbance travels with two wave-fronts, one spherical, the other ellipsoidal; and the two wave-fronts are coincident along the direction of the optic axis. Of such crystals some are positive, such as quartz and ice, and in these the sphere encloses the ellipsoid; in negative crystals, such as Iceland spar and tourmaline, the ellipsoid encloses the sphere. If then a beam of light, plane-fronted, extraordinary refracted ray, E. The radius of the smaller circle is to that of the greater as 1:μ; the tangent to this画a circle, as at right angles to XA, cuts SS' in T: tangents TO and TE to the smaller circle and the ellipse are also drawn so as to pass through T; the ray XA is deflected so as to pass through the points at which these tangents touch these curves; and thus there are two refracted rays, as an eye towards O will see two images of the light. The light of the greater refracting power is found to be polarised (see Polarisation) in a plane containing both the incident ray and the crystalline axis: the extraordinary ray E is polarised in a plane at right angles to this. In biaxial crystals the three optical axes are dissimilar, and the wave-surfaces become complex; there are two sets of refracted rays. If a doubly refracting substance be put between two crossed Nicol's prisms (see Polarisation), light passes; and by this means it is found that many substances ordinarily not doubly refracting become so when exposed to unequal stress, as by pressure, heat, or rapid cooling.

**Conical Refraction.**—In certain cases light, passing as a single ray through a plate of a biaxial crystallised body, emerges as a hollow cone of rays; and in others a single ray, falling on the plate, becomes a cone inside the crystal, and emerges as a hollow cylinder of rays. These extraordinary rays were predicted from the wave theory of light by Sir W. R. Hamilton (q.v.), and experimentally realised by Lloyd. See Preston's Theory of Light (1800).

**Refrigerants** are remedies which allay thirst and give a feeling of coolness, although they do not in reality diminish the temperature of the body. The following are the refrigerants in most common use for external or internal administration: water, barley-water, dilute phosphoric or acetic acid, citric and tartaric acids taken in combination with bicarbonate of potash as effervescent draughts, ripe grapes, oranges, lemons (in the form of Lemonade, q.v.), tamarinds, chloride of potash (ten grains dissolved in water, and sweetened with syrup, to be taken every third or fourth hour), and nitrate of potash, which may be taken in the same manner as the chloride, or as nitre-whey, which is prepared by boiling two drachms of nitre in a pint of new milk; the strained milk may be given in frequent doses of two or three ounces.

**Refrigeration.** In refrigerating machines there is a consequent change of heat from the substance which is to be refrigerated to the cooling agent, which is evaporating fluid, expanding gas, or a material which promotes evaporation of the liquid to be cooled. If 80 lb of Centigrade units of heat be withdrawn from a pound of water at 0° C. it will become a pound of ice at the same temperature. If this heat be withdrawn from the water by an evaporating liquid there are two conditions which must be fulfilled; the evaporating liquid must evaporate very rapidly, and the latent heat of evaporation (i.e. the heat absorbed from outside during evaporation) must be as great as possible. Ether boils at 35° 5' C. (95° 9' F.), and has at 0° C. (32° F.) a vapour-pressure of 18 1/4 cm. (7 3/4 inches) of mercury; at 0° C. it requires 94 lb. Centigrade units of heat to evaporate a pound of it; and at that temperature its evaporation ought accordingly to be as rapid as possible. If the heat of evaporation were withdrawn from water, to freeze 94 lb of water at 0° C. it would require 1907 lb. of ether. Alcohol is more advantageous than ether in respect to the heat required, and is ponderiously less so in respect of its lesser volatility. Liquid ammonia boils at -33° C. (-31° F.), and has at 0° C. a vapour-pressure of 318 cm.
REGENERATION to France chivalry, Nicodemus that the the the the the Artifical vap. political The boiling-one Vol. atm. of kept supcil, but ammonia the Edinburgh becoming Tlie con-
a lat. r=

For producing the simplest apparatus for producing cold dry air for use in the refrigerating chambers of dead-meat-carrying steamers, the principle is that compressed and cooled air will, when allowed to expand against an external resistance, so that it does mechanical work during expansion, lose heat equivalent to the energy which it has expended. In the former the same air is alternately compressed in one place and expanded against some resistance in another.

Porous jars, used to keep water cool, are amongst the simplest kinds of refrigerating apparatus: the evaporation at the outer surface of the jar of the water passing through the porous earthenware taking latent heat from the water (see EVAPORATION).

For details as to refrigerating machines, consult Bondie's Ice-making Machinery (Spon, New York); Spon's Dictionary of Engineering (Ice-making Machines, p. 996); Spon's English Dictionary (Artificial Ice, p. 1133). See also the articles COLD, FREEZING MIXTURES, ICE; and for the Refrigeration of the earth, see EARTH, TEMPERATURE.

Regcline given to persons who have fled from religious or political persecution in their own country, and taken refuge in another, especially to Flemish refugees during the persecution by Alva in the Low Countries, and to French Protestants who fled to England in or after 1685, with the sanction of the English government. See Huguenots, EXTRADITION, POLITI-

Regalbuto, a town of Sicily, 25 miles WNW. of Catania. Pop. 9610.

Regalia, the ensigns of royalty, including more particularly the apparatus of a coronation. The regalia are described at Vol. III. p. 589. The regalia, strictly so called, of England consist of the crown, the sceptre with the cross, the verge or rod with the crown at its top, the orb, the sword called Curtana, the two sharp swords of justice, spiritual and temporal, the ampulla or receptacle for the coronation oil, the anointing spoon (probably the one now kept in the Tower of London), the armaille or bracelets, the spurs of chivalry, and various royal vestments. All these, with the exception of the vestments, are now exhibited in the Jewel-room in the Tower of London. Their total value is estimated at £3,000,000. See BLOOD (THOMAS); and W. Jones's Crowns and Coronations: History of Regalia in all Countries (1883).

The proper regalia of Scotland consist of the crown, the sceptre, and the sword of state. For the crown, see Vol. III. p. 589. The sceptre is of the time of James IV. The sword was a present from Pope Julius II. to James IV. in 1507. During the Civil War the regalia were removed by the Earl Marischal for safe custody from the Crown-room of Edinburgh Castle, their usual place of deposit, to his castle of Dunnotar (q.v.); and the crown, sword, and sceptre were found as they had been deposited at the Union, along with a silver rod of office, supposed to be that of the Lord High Treasurer. They are now in the charge of the officers of state for Scotland, and are exhibited in the Crown-room. See Sir Walter Scott's Account of the Regalia of Scotland (1810).

Regality, BURGHS OF. See BOROUGH.


Regatta. See YACHT, ROWING.

Regulation. See ICE.

Regeneration is a theological expression denoting the spiritual change which passes on all men in becoming Christians. There are various interpretations of the mode and meaning of this change, but its generic effects of baptism or another may be said to be admitted by all branches of the Christian church. By all man is supposed, as the condition of his becoming truly Christian, to pass from a state of nature to a state of regeneration, from a state in which he obeys the mere impulses of the natural life to a state in which a new and higher—a divine—life has been awakened in him. The words of our Lord to Nicodemus: ‘Verily, verily, I say unto thee, except a man be born again, he cannot see the kingdom of God,’ are accepted as the expression of this universal necessity by the Catholic church. It may be truly stated that every branch of the Christian church recognises, although under very different conditions, the Holy Spirit as the author of this change. The change in its real character is spiritual, and spiritually induced. According to a large portion of the Christian church, however, the change is to some extent involved in the rite of baptism. In the Catholic view baptism constitutes always a real point of transition from the natural to the spiritual life. The grace of baptism is the grace of regeneration; and amongst the most important effects of baptism is the remission of all sin, original and actual; (2) the remission of the penalties due for sin both temporal and eternal; (3) the bestowment of sanctifying grace
and the infused virtues; (4) the imprinting of an infallible 'character' on the soul; besides (5) making the recipient a member of Christ and the church, and qualifying to receive the other sacraments. The moment at which baptism is explained at BAPTISM, and see also GORHAM. Protestants hold for the most part that regeneration is a special, conscious process which takes place independently of baptism or of any other outward fact or ceremony. It implies a sensible experience—an awaken whereupon coming to see the evil of sin, and the divine displeasure against sin, and, through the Holy Spirit, are born again, put away their former evil life, and begin to live a new divine life. Technically, Conversion (q.v.) is the action upon man, Regeneration the agency of God.

Regenerator Furnace. See GLASS.

Regensburg. See RATIBSON.

Regent, one who exercises the power without having the name of a king. In a hereditary monarchy there are various circumstances which may necessitate the delegation of the sovereign power—as the devolution of the crown on a minor too young to be entrusted with the kingly office; the incapacity of the sovereign by illness, mental or moral weakness; absence of the sovereign from the realm. A regent under the title of Protestant (q.v.) has often been appointed to exercise royal authority in the sovereign's minority, the latest instance in England being during the minority of Edward VI.; and regents and councils of regency have been sometimes named by the sovereign to provide for the probable nominal of his heir. During the frequent absences of the first two kings of the House of Hanover in their continental dominions, it was the practice to appoint regents or Lords Justices (see Vol. VI., p. 379) to exercise the powers of sovereignty. In 1788, when George III. became incapacitated from exercising the kingly office by insanity, it became a question whether his eldest son, then of full age, had a right to be regent, or whether the nomination rested with parliament. The chief political authorities of the time were divided in their judgment as to the Prince of Wales, but the king, at the end of the discussion. On the return of the madness all parties were unanimous that the regency should be conferred on the Prince of Wales, and this was done by parliament. In 1830 a Regency Bill was passed, providing for the administration of the government, should the crown descend to the Princess Victoria before she attained eighteen years of age; and in 1840, one providing that the Prince Consort should be regent in the event of the demise of the Queen, her next lineal successor being under age. For university regents, see article UNIVERSITIES.

Reggio (anc. Rhetium Julia), a seaport of South Italy, stands on the Strait of Messina, 9 miles SE. of the Strait in Sicily. It is the seat of an archbishop, and has a fine cathedral. Manufac-
tures of silks, scented waters, gloves, stockings, and caps—the last three made from the baysas of the Pinna (q.v.)—the cultivation of fruits, wine, and olives, and fishing are carried on. Pop. 22,525. The ancient Rhhetium was founded by Greeks in the 4th century. It was taken and destroyed by Dionysius of Syracten (387 B.C.), the Romans (270), Alaric (410 A.D.), Totila (549), the Saracens (918), and captured by Robert Guiscard (1081). Pedro of Aragon (1292), and the Garibaldins (1860). In 1783 it was ruined by an earthquake. The province has an area of 2,221 sq. m. and a pop. of 207,328.

Reggio, a city of Central Italy, stands on the ancient Via Emilia, 17 miles by rail SE. of Parma, and is still surrounded with walls. It has a good cathedral of the 15th century, one of the finest theatres in Italy, a model lunatic asylum, a natural history and an antiquarian museum, a library, &c. Pop. 18,634, who manufacture silk, hemp, linen, cherries, figs, and carry on considerable trade, especially in timber. Reggio is the birthplace of Ariosto. During the latter middle ages it was an independent city, but was subject to the D'Estes from 1409 onwards. The bishopric was founded in 450.

Regian Majestatem, a collection of ancient laws being to have been published by order of David L., king of Scotland. The authenticity of the work has been controverted, the prevalent opinion being that it is a compilation from Glanville's Tractatus. Some authorities attribute the collecting of it to a commission of Edward L., others to an unknown author after the war of independence (14th century).

Regicides, the men who were appointed on the parliamentary committee to try King Charles L., but in a narrower sense the men, sixty-seven in number, who actually sat in trial upon him. Of these only fifty-nine signed the death-warrant. After the revolution the committee were brought to trial on a charge of high-treason. Twenty were condemned to death, but only ten were executed, nineteen, together with six others who were not tried, being imprisoned, most of them for life. More than twenty who were already dead were tried and condemned to die the same, and Cromwell, Ireton, and Bradshaw, three of them, were exhumed and hanged at Tyburn, and then reburied at the foot of the scaffold. For regicides in a wider use of the term, see ASSASSINATION, and E. Regis Les Regicides dans l'Histoire et dans le Present (1850).

Regillus, Lake, lies in Latium, to the south-east of Rome, probably near the modern Frascati; it is celebrated in the semi-legendary history of Rome as the scene (496 B.C.) of a great battle between the Romans and the Latins, fighting on behalf of the banished Tarquin, in which the latter were entirely defeated.

Regiment, in modern armies, is a tactical unit, divided into four battalions (q.v.). One regiment, the cavalry, some six or seven Batteries (q.v.) of artillery, or three or four Battalions (q.v.) of infantry— the engineers and other troops being similarly grouped. In the British army the cavalry regiment consists of eight troops (four squadrons) having a war establishment of 650 of all ranks (22 being officers) and 614 horses. It is a tactical unit commanded by a lieutenant-colonel, with adjutant, quartermaster, paymaster, medical officer, veterinary surgeon, transport officer, band, and artificers.

As regards the infantry the regiment is not a tactical unit. The name is often still given to single battalions owing to the fact that previous to 1881 it was used indiscriminately for infantry corps whether they consisted of two battalions, as did the first twenty in the Army List, or of four, as did the 60th. But in that year 133 battalions of the line were reorganised to form 67 regiments, which should each consist of two battalions of line infantry, two or more battalions of militia, and whatever volunteer battalions there might be in the territory allotted to each regiment for recruiting purposes and called its Regimental district. The Cameron Highlanders (the old 39th) were an exception with one battalion. It had been proposed to link them as a third battalion to the Scots Guards; but this arrangement was not carried out, and in 1897 a second battalion was specially raised to complete the regiment. At the same time the Guards retained their old organisation viz. three battalions of Grenadiers, two of Coldstreams, and
two of Scots Guards—and the 60th Rifles and Rifle Regiment. each of four battalions, are allotted to the regimental district at Winchester. The two Westminster (of three grenadier battalions) have been formed into a regiment of two battalions. The regiments of the native armies of India, no militia or volunteer battalions are attached to it. A territorial regiment is therefore a purely administrative unit, and has no war establishment. It is a regiment for police duty, composed, assisted by an adjutant and quartermaster, and its depot companies, two for each line battalion, train recruits for the service companies.

The Royal Regiment of Artillery is also a purely administrative organisation, including all the horse, field, and mountain batteries and garrison companies of the regular army. The corps of Royal Engineers similarly comprises all the officers and men of that arm. Militia and volunteers are attached to each, and they are each represented at the War Office by a deputy adjutant-general.

The word regiment began to be applied to bodies of British troops in Elizabeth's reign; regiments are spoken of at the time of the Armada, 1588, and as composing the force in Ireland, 1598. From that time forward the army and militia of Britain have been organised into regiments and districts, and the parliament each raised regiments, all of which were disbanded at the Restoration, with the exception of the Lord-general's Regiment of Foot and his Life Guard of Horse. These two were re-engaged (1661) and form the present Coldstream Guards and Grenadier Guards. In the first year a Scotch corps of 1700 men, which had taken service in France in the time of James L., returned to England, and was included in the British army as the 1st Foot. See ARMY, Vol. I. p. 433. In 1660 was formed the troop of Horse Grenadier Guards, and the 2d troop in 1702. These were re-formed in 1782 as the 1st and 21 Life Guards.

Regimental officers are those who are actually doing duty with a regiment, battalion, battery, or company as combatants, in contradistinction to those who may be on the staff or otherwise employed.

Regimental badges, mottoes, and devices are detailed in the Queen's Regulations, and emblazoned, with the battles and campaigns in which either of the battalions of the regiment has been engaged, on the shoulder-straps for appointment.

Regimental pets are animals which accompany the troops on all occasions and have a recognised place on parade. Many infantry battalions have them—e.g. the Royal Welsh Fusiliers always have a white goat, which since the year 1844 has been regularly presented to them by the Queen.

For Regimental Schools, see ARMY, Vol. I. p. 439.

Regimental district (formerly brigade depot) is the territory allotted to each infantry regiment of the British army. The localisation of the forces followed naturally on the adoption of a short service system. The increased number of recruits annually required necessitated the spreading of recruiting agencies over the country, and the desirability of obtaining men from a district to which they would afterwards return as reservists was a regimental system. The 1773 has been modified in many ways, and may be briefly summarised as follows: For the purposes of command, the United Kingdom is divided into 14 districts—ten for England, one for Scotland, and three for Ireland (the Channel Islands command does not share in the localisation scheme), under general officers. Each of these districts has a floating body of regular troops, and is subdivided (with the exception of the Thames, Woolwich, and Aldershot districts) into a certain number of regimental districts, 60 altogether.

To each of these regimental districts are assigned, normally: (a) Two line battalions—if possible one at home and one abroad (see, however, REGIMENT); (b) regiments of artillery and line battalions) have; (c) the militia and volunteer battalions of the district, as well as the infantry of the army reserve. The linked battalions of the line together with the militia battalions form a territorial regiment—to which the volunteer battalions are attached. If possible a territorial regiment draws its recruits from its own district, and the promotion of officers of the line takes place in the regiment and not in a particular battalion. Militia or volunteer recruits are trained at the depot, and every effort made to maintain the connection between the line and the militia. Each regimental district is in charge of a lieutenant-colonel, who superintends the recruiting of the district, and commands the auxiliary and reserve forces in it. His staff comprises an adjutant, quartermaster, paymaster, medical officer, and the usual non-commissioned officers.

Regina, capital of the Canadian province of Assiniboia and seat of government of the North-west Territories, 357 miles by rail W. of Winnipeg. The chief buildings are the lieutenant-governor's residence and the headquarters of the mounted police. Pop. 2000.

Regiomontanus, a German mathematician and astronomer whose name was Johann Müller, was born at Königsberg in Franconia, 6th June 1456. From his birthplace he called himself in the mediæval fashion Johannes de Montegroce; since 1544 Regiomontanus is the name by which he has been known. He was a disciple of George Purbach (1423–61), studying under him at Vienna and elsewhere. In 1461 he accompanied Cardinal Bessarion to Italy in order to learn Greek. He sojourned in Rome, Ferrara, Padua, and Venice; returned for a time to Vienna, and was called by Matthias Corvinus to his court at Buda; but in 1471 he settled in Nuremberg, where a learned and wealthy citizen, Bernhard Walther, subsidised him so as to enable him to construct mathematical and astronomical instruments and to write the fundamental works of his life. The two were associated so closely that the correspondence of the 'Alphonso Tables,' and jointly published Ephemerides 1475–1506 (1473), of which Columbus and other early navigators made much use. Regiomontanus not only worked at astronomy, but restored the study of algebra in Germany and encouraged the science of trigonometry, and published treatises on water-works, burning-mirrors, weights and measures, &c. He was summoned to Rome by Pope Sixtus IV. to assist in reforming the calendar, was made Bishop of Ratisbon, but died at Rome, 4th July 1476.

Among his works are De Doctrina Triangularum (1463); De Quadratura Circuli (1463); Calendarium (1473); De Reformacione Calendaris (1484); De Conic Magnitudine (1531); De Triangulis Omnimodi (1535). See Zinger, Regiomontanus, ein gelehrter Vor¬ läufer des Kolumbus (1874).

Register of Voice. See Voice.

Registers, PARISH. The place where parish registers now fill was formerly, but only in very small part, supplied by monastic registers, which, however, as a rule registered only deaths of important persons, so as to be able to tell when masses became due. In the last century there were naturalizations of the families of founders, benefactors, and the like. Entries were also sometimes made in the missals of parish churches, and the monastic chronicles often contain necrologies, whilst mortuary rolls were regularly sent round from monastery to monastery.
These were in effect the sole early public registers, but private necrologies were sometimes kept by the chaplains of great families, e.g. Friz Blackham, who left one of the Paston Halls and Mrs. Upton's and Burn's (History of Parish Registers) mentions several entered in the flyleaves of private books of devotion. But it is mainly to the monastic cartularies and to inquisitions post-mortem and proofs of age that we must go for information on births and deaths of the pre-Reformation period. It is probable that the injunction of Thomas Cromwell in 1538, ordering parish registers to be kept under the system now in vogue, was intended, like Edward VI's scholastic regulations, to meet one of the immediate difficulties connected with the suppression of the monasteries. Had this injunction been strictly acted on we should now be in possession of complete registers from that date onwards. But, perhaps owing to the fall, soon after, of the author of the injunction or to the general laxity of the incumbents, very little heed was taken of it, and the evil which this neglect entailed became so crying that Elizabeth in 1557 issued a stringent order that not only should the registers be better kept, but copies of them should be yearly sent to the bishop of the diocese, an order which was published in 1582 with an enjoining the preservation, arrangement, and indexing alphabetically of the names on the registers. But nothing has been of much value against the ineradicable neglect of the incumbents and bishops. Early transcripts are practically non-existent, and even those of the 18th century are most imperfect. In the returns of the population abstracts in 1801 it was discovered that amongst 11,000 parishes in England 812 registers dating from 1558 alone existed, and later returns in 1854 showed that even that small number had decreased by the negligence of the clergy in the interval. These last returns give full details as to the date of the commencement of each register in England. The only hope in the future for the preservation of the remnant lies in the instant removal from the parish churches (or, as is too often the case, the incumbent's library) of the actual registers and of the transcripts from the bishops' registers to the Public Record Office or to some kindred institution, otherwise further loss must be expected in spite of the fact that many of the clergy are at last waking up to their duty in this respect, and having the registers preserved in their registers, while some have been printed by the Harleian Society and by private individuals.

A full list of the printed registers was issued in 1891 by Dr. G. W. Marshall. Other standard works on the subject are Pigot's Observations on Parish Registers (1764) and Burn's History of Parish Registers (1829; 2d ed. 1862), while brochures on the same subject have been printed by Mr. Chester-Waters (1870; new ed. 1887) and Mr. TASWELL-LAUNGMEAD.

From these works the reader may see how the registers often contain much valuable information as to the history of the parish, many incumbents slightly overstepping their strict duty by putting down noticeable and curious incidents which occurred from time to time. The proper fees for searching are one shilling for the first year (which includes the cost of the paper, etc.), and for subsequent years, though some clergymen try to charge them separately) and sixpence every subsequent year. It seems doubtful if the searcher may take general notes, but he may copy one entry per year without being compelled to pay the further fee of 2x. 7d. which is the usual charge for obtaining an abstract of information from the registers. It seems sixpence in every subsequent year. It seems doubtful if the searcher may take general notes, but he may copy one entry per year without being compelled to pay the further fee of 2x. 7d. which is the usual charge for obtaining an abstract of information from the registers.

Registration may be described as an account of certain transactions and legal facts inserted in a book or books of record. The purpose in view is usually to preserve an authentic and exact record of the transactions, to secure for them a means of publicity, or to simplify the methods of proving them. The practice of inscribing a copy of private documents in a public register seems to have been originally introduced by the Emperor Leo in reference to gifts—the object being to enable heirs to ascertain to what extent was liable before deciding whether to accept the inheritance. A system of registration is now employed in many different departments and for very different purposes, in which registration is carried varies very much in different countries; on the whole, however, it is more carefully enforced and more widely applied in continental states than in England or America. In France and Italy, for example, in almost all transactions parties resort to a notary, who draws up the documents relating to the business in hand. Such notarial transactions are to a certain extent public acts, and are presumed to be valid and binding, until they have been impeached and set aside by a separate proceeding instituted for that purpose. The same is true of documents executed in the presence of a notary having any reference to certain subjects—for example, to the creation or transfer of an interest in land—are transcribed by him in a public register, and are become available for general information. In England all judicial decisions and all the proceedings of the higher courts in their various stages are registered; and with registrars attached to the Privity, council, the supreme court, and the county courts, affidavits, pleadings, &c., are filed. Probates of wills and letters of administration, both of which are really judicial proceedings, are registered in the Probate Division in London, or in one of the district registrars, which are situated at various places throughout the country. Land registries, for officially recording the title to, dealings with, and charges on land, are of two classes—viz. registries of title and registries of assurances. The former are authentic and self-explanatory records, behind which one cannot go except in case of fraud. The latter merely contain a statement of the existence of documents or assurances affecting the title, and the index of the document, and leaving the persons concerned to draw their own conclusions as to the effect of these documents on the title to the land. The whole subject of land registration has been much discussed of recent years in England, and several attempts to establish a system of registration have been made without much success. Lord Westbury's Act (25 and 26 Vict. chap. 53), establishing a general land registry for England and Wales, has notoriously proved a failure. The present statute regulating the general registration of land is the Land Transfer Act (38 and 39 Vict. chap. 87), which creates an office of land registry in London; but in the case of this act also practical results have been very small. The doubts and complications surrounding titles to land in England are so appalling that, though a compulsory system of registration is universal in many countries, the British parliament has not dared to enforce it. Bills of sale must be registered within seven days after execution, or, if executed out of England, then within seven days after their arrival in England; further, a bill, if still existing, must be registered within one year—unless the Merchant Shipping Acts every British ship must be registered, as also must all changes of ownership in a ship, whether by sale, mortgage, death, or bankruptcy; in the United
REGISTRATION

625

Kingdom the principal officer of customs at the port of registry is the register or clerk. After 1828 other principal officers are the registrars of joint-stock companies, established by the Companies Acts; the register of friendly societies; the registers of designs, copyrights, patents, and trade-marks; the registers of seamen, of newspapers, of solicitors, of personal property, &c.

In Scotland registration is an important feature in the administration of the law. It may be treated under two heads viz. registration for preservation and execution, and registration for publication. Registration in order to execution—i.e. to enforce the rights of the party are a coroners reform from the practice of churchmen, who, in order to bring the enforcement of ordinary contracts within their jurisdiction, procured the insertion in obligations of a solemn oath of performance and consent to excommunication in the event of failure. It is now an almost universal practice to insert a clause of registration in deeds stipulating for money payments, especially in bonds. A short clause of registration has been introduced by recent conveyancing acts, in these words: 'And I consent to registration hereof for preservation (or for purposes of law) in the books of the parish clerk, and if any deed or writing whatsoever, is declared to import a consent to registration and a procurator of registration in the Books of Session and the records, or other judge's books competent therein to remain for preservation and also, if for execution, that letters of bonning and all necessary grants to the executor shall pass thereon, upon six days' cliarage, on a decree to be interponed thereto in common form' (31 and 32 Vict. chap. 101, sects. 8, 138). Such registration for execution, which is in effect a short cut to a writ of probate, is a form of administration, must take place after the death of the creditor or of the debtor. By special statutes the privileges of registration in order to diligence are extended to bills and promissory-notes, the acceptance and subscription of which implies a consent to registration for execution. The records now available for registering deeds for preservation or execution are these: (1) The Register of the Great Seal; (2) the Books of Session and Censorship, for all deeds and probative acts; (3) the books of any sherff court; (4) the books of royal burghs, for instruments of probate, wills or testaments; (5) the General Register of Sasines.

Registration for publication applies chiefly to writs connected with heritable rights. The present system owes its origin to the statute 1017, chap. 16, which established a general register in Edinburgh, and particular or local registers throughout the country, in which sasines and other acts affecting heritable property should be registered within sixty days of their date. The instrument of sasine and the whole ceremony of sasine are now dispensed with in the transfer of lands; by the Titles to Land Acts of 1858 and 1860, the recording of the conveyance itself, with warrant of registration thereon, now constitute the only legal effect to the same as if an instrument of sasine had been executed and recorded at the date of recording the conveyance as evidence of the subsequent execution and recording. The registers for publication now subsisting are (1) the General Register of Sasines, divided into counties; (2) Register of Entails; (3) General Register of Inhibitions and Adjudications; (4) the Burgh Registers of Sasines for lands in each royal burgh in which such a register has been in use to be kept; are public registers of Scotland used to be under the charge of the Lord Clerk Register; but the duties of that functionary in this connection were by 42 and 43 Vict. chap. 44, sect. 5, transferred to the Depute-clerk Register. All the records are collected at the General Register House in Edinburgh.

In the United States, in order to be wholly valid, a deed or other instruments affecting the title to real estate must be recorded in the proper office for the registry of deeds, and this constitutes constructive notice of its contents. A chattel mortgage must be filed to be effective against third persons. That is valid between parties without filing. In most of the states the effect of the filing continues only for a limited period, usually for a year, and the mortgageee must consequently refile within the prescribed time. The certificate of the recording office is considered as an authority of the state. A digest of the provisions of the different statutes as to the registration of deeds, see Stimson's American Statute Law, sect. 1601 et seq.

REGISTRATION OF BIRTHS, DEATHS, AND MARRIAGES is the name for the system of regulations prevailing for a record of these events in England the first act on the subject dates from 1836. By it a general register-office was provided at Somerset House, London, for England and Wales. But even before the new arrangement there had been in operation an ecclesiastical method of recording baptisms, marriages, and burials in connection with each parish church, it being the duty of the officiating minister to keep such a register. See REGISTERS (Parish). Also, since 1592, the compilation of weekly bills of mortality (q.v.),containing particulars as to the death-rate of London, has gone on almost uninterruptedly. These modes of registration were found to be well-nigh useless for statistical purposes. Hence the systematic plan instituted in 1836, by the Acts 6 and 7 Will. IV. chaps. 55, 56, which have been a model of order and correctness in administration, and are still the basis of the whole being entitled the Births and Deaths Registration Acts, 1836–74; the last and most important is the 37 and 38 Vict. chap. 88. There are special legislative provisions as to the registration of marriages. The acts provided that the head of the system should be the Registrar-general of births, deaths, and marriages in England. An annual abstract of the registrar's returns must be laid before parliament. Every poor-law union throughout the country is subdivided into districts, and in each district a locally-resident registrar is chosen by Superintendents of parishes and are also appointed. The registrars make out their returns quarterly, and send them to the super-intendent-registrar of the district, by whom they are transmitted to the general register-office. There they are preserved, and may be inspected or excepted on payment of a small fee.

Births.—In the case of every child born alive, the father and mother, or, in their default, other specified persons, are to give notice of such birth to the district registrar within forty-two days after the occurrence. If this is not done he may require any of the defaulters, by notice in writing, to attend and inform him, within three months of the birth, with the particulars thereof. Special provisions are made for the case of foundlings, children born at sea, &c. It is the duty of the registrar to maintain the books of births, and keep the entries of births, and register the same within three months free of charge. After three months the birth can only be registered with certain formalities, including payment of a small fee, and after twelve months only with the written consent of the Registrar-general. The particulars to be registered are the place and date, sex of child, its name and that of the mother and the father, with the calling of the latter. The signature and description of informant are also noted. The date of registration and signature of registrar complete the entry.

Marriages.—These may be religious or civil. In
the first case they may be performed according to the rites of the Church of England, of the general body of Nonconformists, of the Society of Friends, or of the Jews. The Registrar-general must send marriage register-books to the minister of every church, and the clergyman must send them to each registering officer in England of the Society of Friends or Quakers, and every secretary of a synagogue in England. In each case, the official to whom the book is sent must register in two of the books in duplicate the particulars of the marriage, the names of the parties, and the time and place of the ceremony; and a quarterly return is also furnished to him. In the case of Nonconformists other than Jews and Quakers, the registrar attends at the registered building, and registers the marriage himself, as he also does when it is a purely civil ceremony taking place at his office. The particulars entered are date of marriage and name, age, condition, calling, residence, father’s name and calling of both parties.

Deaths.—Much of what has been said about registration of births applies to registration of deaths, but the following points are to be noted. Notice must be given within five days of the occurrence by the nearest relative of the deceased present; if he does not, the duty falls on other specified persons. A notice preliminary to registration must be given, and the time expires in fourteen days. In default of action of others, the registrar ought to require the person liable to appear before him within twelve months from the death have elapsed, and supply him with the statutory particulars. After the lapse of twelve months he must be within the authority of the Registrar-general before the entry can be made. There are special provisions for inquest cases, &c. The particulars of registration are date, place, name, sex, age, calling, cause of death, name of certifying medical man, name and description of informant, date of registration, and signature of registrar. Provision is made for sending notice of the death of medical practitioners, &c., to special registrars, in order that their names may be struck off special lists.

All the registers since 1836 and a number of the older ones are preserved in Somerset House. The registrars are bound to keep, on payment of a fee, a search of such recent registers as are in their possession. There are thirty-nine acts on the subject. They are from the 52 Geo. III. chap. 160 to the 50 and 51 Vict. chap. 71. In Ireland, as in England, the law of 1836 is almost exactly the same as in England. There is a Registrar-general and a general registrar-office at Dublin. In the case of Roman Catholic marriages, a registrar’s certificate must be obtained and produced before celebration. The officiating clergyman then fills it up; it is returned to the registrar, who enters the particulars in the proper books. Other religious marriages are registered in the same manner as Church of England marriages are in England. There are fifteen acts dealing with the subject, the first being the 7 & 8 Vict. chap. 81, the last the 43 and 44 Vict. chap. 13.

Although the law in Scotland on this subject is much the same as in the rest of the United Kingdom, some points of difference are to be noted. The general registrar-office is at the Register House, Edinburgh. The offices of registrars are held by the Deputy-clerk Register. Notice of a birth is given in twenty-one days; after three months a declaration must be made before the sheriff by the informant of the particulars proposed to be registered. Provision is made for correction of the register. The case of regular religious marriages is a statutory schedule is produced to and filled up by the officiating minister. It is then sent to the registrar, who enters the necessary particulars in his book. The register is then sent to the registrar of the county, or of the city, as the case may require, to be presented at marriage, and register the same. There is a fixed fee for this is 20s., and he is entitled to the same sum for registration after conviction or decree of declarant of an irregular marriage. There are ten acts dealing with the subject; the first being the 30 & 31 Vict. chap. 10, the last the 48 and 49 Vict. chap. 61, sect. 5. It will be understood that penalties of varying degrees of severity are enacted against breakers of the Registration Acts. See FLAXMAN’s Registration of Births and Deaths in England, Wales, and at Sea (1875).

REGISTRATION OF VOTERS.—It is a condition precedent to the exercise of the right to vote in parliamentary elections that the name of the voter should be upon the register—a preliminary requisite first introduced when the franchise was remodelled in 1832. In England the process of registration, which was settled by the last Registration Act (43 & 44 Vict. chap. 5), is as follows: On the 15th of April in each year a precept, containing a description of the qualifications which entitle persons to be registered as voters, is sent by the clerk of the peace in a county, or by the town-clerk in a borough, to the churchwardens or other persons in whose parish the register is kept. On the 31st of July the overseer must make out a list of occupiers, whom he has ascertained to be qualified—persons who have paid their rates, and who are not disqualified by receipt of pamphlet relief—and a list of lodgers, who have sent in their claims to vote in respect of their lodgings. By the 20th of August all new claims have to be sent in, and the lists, together with notices of objections, have to be published on the door of every church or public chapel in the parish. These lists of occupiers and of claims and objections are then sent by the overseer to the clerk of the peace in a county, and to the town-clerk in a borough. In September the revising barrister comes round and adjudicates upon disputed claims and objections; from his decision an appeal lies on a case stated by him to the Queen’s Bench Division of the High Court. After the revision, the register is completed. If it is for a county, there are three lists—lists of ownership, occupation, and lodger voters; if it is for a borough, there are two lists—the ownership list being omitted in boroughs.

In Scotland the system of registration is carried on large and uniform lines, the machinery introduced, for the valuation of land, by the Valuation Act (17 and 18 Vict. chap. 91). The valuation roll, annually made up under the Valuation Act, is the basis of the register of voters; a new form of this valuation roll was provided in the Registration Act of 1855, each dwelling-house in the county or burgh being now specified in the roll. The duties of assessor for registration purposes are performed by the valuation assessor of each burgh, or county, or division of a county; he may not be a sheriff, sheriff-depute, collector of poor-rates, or employed factor or land agent in the county or burgh for which he is assessor. Every year, on or before the 15th of September, the assessor makes out a list of voters, arranged alphabetically according to wards or parishes and polling districts, and publishes the same. The list is to be deposited at the office of the sheriff, or other conspicuous place. Any person whose name is on the list may object to any other person as not having been entitled, on the last day of July preceding, to have his name inserted, by giving notice in a form prescribed, or on or before 21st September in case of any objection to the person so objected to; similarly, any person whose name has been omitted may claim to have it inserted,
REGNAULT

REGIUM DONUM

REGNAULT

by notice to the assessor. Between 25th September and 16th October sheriffs hold open registration courts for the purpose of revising the lists of voters and disposing of claims and objections. The revised list is delivered by the sheriff to the town-clerk or the sheriff-clerk, and, being printed, constitutes the register of voters.

His appeals were Le Drotiat (1697), Le Retour Imprém (1700), Les Folies Amoureuses (1704), Les Mémoires (1705), and his masterpiece, Le Sénateur Unhappy (1758), three years before his death, and so suddenly as to originate various contradictory reports, 4th September 1709.

Regnau was an indolent poet, but he was a master of dramatic situation and of comic dialogue, if not of versiunlity or reality. To this day the reader endorses Redc'l's complaint, as some one charged Regnau with mediocrity—'Il n'est pas médiocrément rai.' 'Qui ne se plait point à Regnau,' said Voltaire, 'n'est pas digne d'aimer Molière.'

There are editions by Didot (1820), Michiels (1854), and Fournier (1875). See the study by Mahrenholz (Oppeln, 1887), and Bibliographie by Marchéville (1857).

Regnauux, Alexandre Georges Henri, painter, was born in Paris, 30th October 1843, the son of Henri Victor Regnauux (q.v.). His aptitude for drawing manifested itself very early, and he was continually sketching the animals in the Jardin des Plantes. After an excellent education in the Lycée Napoleon, he left for England in 1850, and studied art under Lanotohe and Cabanel; and, after two unsuccessful attempts, gained the prix de Rome in 1866. Reaching Rome early in the following year, he executed there a remarkable portrait of Madame Dumas, an historical subject of 'Auteomedon breaking the Horse of Achilles,' and drew on wood illustrations for Way's Rome. He next passed to Spain with his friend Clarin; and here, as afterwards in Tangiers, he found subjects of that wildly picturesque character which best suited his genius. In 1870, he painted his powerful equestrian portrait of General Prim, now in the Louvre, and his 'Judith,' and in 1870 contributed his 'Salome' to the Salon. In 1870 was also painted, at Tangiers, his terrible picture, 'The Execution without Judgment under the Moorish Kings of Granada'—a work now in the Louvre. In the same year he returned to Paris on the outbreak of the Franco-Prussian war; and, though, as a prix de Rome, he was exempt from military service, he volunteered as a private soldier, and on the 19th January 1871 his slain brother was buried in the field of Battle, near Bouvron, in the same year. As an artist he had by no means fully expressed himself; but he had produced much that was marked by great energy and power, that caught in a peculiarly vivid way the splendid and barbaric life of the East—a life, in the words of the painter himself, 'at once rich and great, terrible and voluptuous.' A monument to Regnauux, sculptured by Henri Chapu, has been erected in the Ecole des Beaux Arts, Paris.

See the Lives, in French, by Cazalis (1872) and Marx (1887), and his Correspondence, ed. by Duprace (1873).

Regnauux, Henri Victor, chemist and physicist, was born at Aix, 24th July 1810. A shopman in a Paris bazaar, he made such good use of his scanty leisure as to qualify himself for admission in 1830 to the Ecole Polytechnique, and, after the two years' course, came out as a mining engineer. He became a professor in Lyons, and, later, was made a member of the Academy of Sciences, in consequence of some important discoveries in organic chemistry. Having filled chairs in the Ecole Polytechnique and the College de France, he became in 1854 director of the imperial porcelain-making factory of Sèvres. He devoted himself to the determination of important physical data, such as the laws of expansion of gases, the measure-

Reginnaux, Jean Francois, French comic dramatist, was born at Paris in 1855. A rich shopkeeper's son, he found himself at twenty master of a considerable fortune, and at once set out on his travels. In Italy he gave himself up to gambling, but, strange to say, increased rather than diminished his means. In his autobiographical romance, La Promenade, we read, but somewhat dubiously, of the passion of himself as Zelme for a young Portuguese wife (Elvire), his voyage back to France with her and her husband, their capture and sale as slaves by Algerian pirates, how he made himself pleasing to his master by skill in cookery, was captured himself but not so much as his mistress, was ransomed, together with the lady, for 12,000 crowns. He was next about to marry when the husband reappeared, and sent the lover off again on aimless wanderings through Holland, Denmark, Sweden, Germany, Russia, Poland, Turkey, Hungary, and Germany. From his return to Paris (1858) he gave himself to letters, and found his true vocation in the success of Le Divorce at the Théâtre Italian in 1868. Eight years later his fine comedy, Le Junior, achieved success at the Théâtre Français. Its successors were Le Drotiat (1697), Le Retour Imprévu (1700), Les Folies Amoureuses (1704), Les Mémoires (1705), and his masterpiece, Le Sénateur Unhappy (1758), three years before his death, and so suddenly as to originate various contradictory reports, 4th September 1709.
ment of temperature, latent and specific heats, and especially the numerical data bearing on the working of steam-engines, for which the Royal Society of London awarded him their Rumford medal (1829) of the Royal Society, and was one of its foreign members. In addition to numerous papers in the Annales de Chimie, &c., he published a Cours Élémentaire de Chimie (4 vols. 14th ed. 1824), and a translation of the works of Regnault, the French chemist (2 vols. 1837.)

Regnier, Mathurin, a great French satirist, was born at Chartres, 21st December 1753. His father was a well-to-do citizen; his maternal uncle was the Abbé Desportes the poet. The boy was tonsured at nine, but grew up dissipated and idle. In early youth he seems to have visited Italy in the suite of the Cardinal de J Boucicaut, and is supposed later to have transferred his services to Philippe de Bethune, who went as ambassador to Rome in 1691. He obtained a canonry at Chartres, and enjoyed the favour of Henry IV. and his court. But his follies were his health, and he died an untimely death, 13th October 1713. His first collection of satires had appeared in 1688. Regnier's whole work together scarce exceeds 7000 lines—sixteen satires, three epistles, five elegies, and some odes, songs, epigrams, and miscellaneous pieces—yet if it be true that the order of birth is among the poets of France. He is greatest in his satires, written in the usualAlexandrine couplet, and admirably polished, yet vigorous and original. They touch social and moral questions only, and consequently are not of merely ephemeral interest, as political satires many often are; and, what is rare in French satire, they mostly escape the fault of handling abstract types instead of actual concrete embodiments of the type. Breadth, force, and reality characterise them all, but these merits together reach their highest point in the thirteenth, Marcette, a satire on a hypocritically old woman who corrupts the hearts of the young around her by her cynical views of life. Regnier imitated indeed the satire of Juvenal and Horace, yet he did not copy it, and he throw his own into new the form he bore himself was defended by the senators as a poet, and it was a model of the most supreme heroism, how Regnault at first refused to enter Rome since he was no longer a citizen; how, after this conscientious scruple was overcome, he declined to give his opinion in the Senate till that illustrious body laid upon him its commands to do so; how he then earnestly dissuaded them from agreeing to any of the Carthaginian proposals, even to an exchange of prisoners; and now, after he had succeeded by his earnest appeals, the rejection of the Carthaginian offers, he resisted all persuasions to break his parole, though consciences of the fate that awaited him, and, refusing even to see his family, returned with the ambassadors to Cartaghe, where the rulers, mankind by the failure of their schemes through the influence of Regnault's unflinching bravery, and the most horrible tortures. The common story is that he was placed in a cask or chest stuck full of nails, also that, with his eyelids cut off, he was exposed to the glare of the African sun. Unfortunately this noble tale of heroic patriotism and unflinching fortitude is unhistorical, or at least unsupported by any good authority.

Regnault, or Rule, St, according to legend, a monk of Constantinople or bishop of Patras who in 347 A.D. came to Muckross or Kilriment (afterwards St Andrews), bringing relics of St Andrew to Scotland from the East. The adoption of St Andrew as the national patron saint appears to belong to the first half of the 8th century; and for the possible identification of St Regnault with an Irish St Ringail of the 6th century, see Skene's Celtic Scotland (vol. ii. 1577).

Regn, the rich, black cotton soil of India. It is the result of the long-continued growth and decay of vegetation—the organic residue being commingled with the disintegrated and decomposed debris of the subjacent rocks.

Rei. See MILREI.

Reichenbach, a manufacturing town of Saxony, 11 miles SW. of Zwickau, produces woollen fabrics—merinoes, flannels, shawls, quilts, cashmeres—and has wool-spinning, dyeing, and calico-printing works. Pop. (1890) 21,496.

Reichenbach, a town of Prussian Silesia, 46 miles by rail north of Liegnitz, on the river Lina.

Reichenbach, Heinrich Gottlieb Ludwig (1793-1879), a botanist and zoologist, from 1829 a professor at Dresden.—His son, Heinrich Gustav (1824-90), was also a botanist, a professor at Hamburg from 1862. He was famous in connection with amphipods.

Reichenbach, Karl, Baron von, naturalist and zoologist, was born at Stuttgart, 12th February 1788, and educated at Tübingen. After a short political imprisonment at the instigation of the French authorities, he studied the industrial arts, and in 1821, in connection with the Count of Salm, he commenced a number of manufactories of different kinds at Blansko in Moravia, which he managed with great success, retiring with a fortune. He devoted much study to the compound products of the distillation of organic substances, and he succeeded in bringing to light a number of...
compounds of carbon and hydrogen not previously known; among these were erastece (1833) and paraffin. Studying with enthusiasm the subject of animal magnetism, he discovered, as he thought, a new force in nature, which he called Od (q.v.), and conceived to be intermediate between electricity, magnetism, heat, and light, and recognisable only by the nerves of sensitive persons. His chief work, however, is his Landscape Work (1834), Untersuchungen über die Dynamik des Magnetismus (1847-49), several works on ‘odic force’ (1852-58), Aphorismen (1866), Die Oidische Loke (1867). Several of his works have been translated. He died at Leipzig, January 19, 1869. See biographical works by Schröter (1869) and Fechter (1876).

Reichenberg, the chief seat of the cloth manufacture in North Bohemia, stands on the Neisse, 86 miles by rail NE. of Prague. Apart from the principal industry, in which, in the town and neighbourhood, some 10,000 workmen are employed, cotton and woollen fabrics, machinery, and leather are the cloth industries, established here in the 16th century. There is an important industrial school. Pop. (1890) 31,033.

Reichenhall, an Alpine spa in the extreme south-east of Bavaria, 10 miles SW. of Salzburg. It was almost wholly consumed by fire in 1834, and has been handsomely rebuilt. It is the chief centre of the Bavarian salt-works, and in the manufacture of salt (11,800 tons annually) its 3436 inhabitants are for the most part employed, though the delightful air of the valley in which it stands, and its saline springs, attract about 6000 visitors every summer. The salt-springs are fifteen in number, and lie at a depth of 50 feet; two of them yield 25 per cent. of salt. A brine conduit, 75 miles in length, conveys the water of the salt-springs from Berchtesgaden, through Reichenhall, over mountain 1150 feet high, to Traunstein and Rosenheim, in the vicinity of which abundant timber for fuel is procurable.

Reichstadt, Duke of. See NAPOLEON II.


Reid, Captain Mayne, writer of boys' stories, was born in County Down in 1818, and at twenty emigrated to America, where he led a vigorous and adventurous life, served in the United States army during the Mexican war of 1847, and distinguished himself especially in the storm of Chapultepec. The Hungarian struggle, in which he had meant to take part, was at an end before he reached Europe, whereupon he settled down to a literary life, first at London, next in Buckinghamshire. He died October 22, 1883. His vigorous style and the profusion of hairbreadth 'snaps' he provided delighted his breathless readers, who did not stop to notice the truthfulness of his scenery and the occasional excellence of the narrative style. Among his best books were the Boy Hunter (1853), the Bush Boys (1856), and the Boy Ter (1869), the Scalp Hunters (1847), the Rifle Rangers (1850), the War Trail (1857), and the Headless Hunter (1865). See the Memoir by his widow (1890).

Reid, George, P.R.S.A., was born at Aberdeen, 31st October 1841. After having been trained as a lithographer, he studied art in the Trustees' Academy, Edinburgh, under Mollinger at Utrecht, under Yvon in Paris, and with artists at the Hague. He A.R.S.A. in 1870, and R.S.A. in 1877, and succeeded Sir W. F. Douglas as P.R.S.A. in 1891. He is most widely known by his portraits, which are distinguished by unfinishing verismimitude, vigorous handling, and thorough modelling. His half- and full-lengths are remark-

able for their individuality of attitude, for the insight with which, in each case, the characteristics of the sitter are expressed by the entire figure, as well as by the face. Among his more important portraits are 'Lord President Ingils,' in the Scottish Parliament House; 'H. Wellwood Maxwell of Munchers;' and 'John MacKenzie.' He has also produced many rich, freely painted flower-pieces, as well as landscape work of a delicate and quiet charm; and his book illustrations prove him one of the most accomplished of living draughtsmen.

Reid, Thomas, head of the Scottish school of Philosophy, was born on the 26th April 1710, at Strachan, a country parish in Kincardineshire, where his father was minister. His mother belonged to the well-known family of the Gregories (q.v.). Reid began his education at the parish school of Kincardine, and at the age of twelve he became a student of Marischal College in Aberdeen. He took his degree of M.A. in 1726, and continued to reside in Aberdeen as college librarian, his chief studies being mathematics and the natural philosophy of Newton. In 1736 he left Aberdeen, and went to England, where he was introduced to the most distinguished men in Oxford, Cambridge, and London. In the following year he was presented by the senators of King's College to the parish of St. Mary of Fullerton in London. In 1748 he was led to seek a new foundation for the common divines. In 1739, Hume's Treatise on Human Nature appeared, the perusal of which gave the impulse that determined Reid's future philosophical career. He had fully adopted the idealism of Berkeley, but was now revolted by the conclusions drawn by Hume. The result of this was that it was led to seek a new foundation for the common divines as to a material world. In 1748 he contributed to the Royal Society of London a short essay on Quantity. In 1752 he was appointed one of the professors of Philosophy in King's College, Aberdeen, the summons being the part of the patron of the chair. Here he followed the established course of teaching in three successive years to the same students mathematics, natural philosophy, and moral philosophy. He was the founder of a Literary Society in Aberdeen, which enrolled among its members Campbell, Beattie, and other men of ability; and in this society he submitted his first draft of the Inquiry into the Human Mind. In 1763 he was chosen to succeed Adam Smith as professor of Moral Philosophy in the university of Glasgow. In 1764 he published his Inquiry. His third for general science never left him; at the age of fifty-five he attended Black's lectures on Heat. He continued in the duties of his chair till 1798, when he retired to devote his remaining strength to the publication of his works on the mind. In 1783 the Metaphysics and Experiment of Human Understanding was published, and in 1788 the Active Powers—together forming a systematic work on the science of the human mind. In 1774 he had contributed his account of Aristotle's logic to Lord Kames's Sketches. The publication of the Active Powers was the close of his career as an author, and at the end of his life he set up his bodily and mental vigour and his interest in science. He was taken ill suddenly in the autumn of 1796, and died on the 7th October.

Like Kant, Reid was roused to metaphysical research by Hume and became the chief of a school whose aim was to deliver philosophy from scepticism, and to do so by resting finally on principles of intuitive or a priori origin. The Scottish philosophy, dominant till Sir W. Hamilton's time in Scotland, and influential in France (see ROYER-
REIGATE

Collard), found azealous defender in McCozi (q.v.).

See Common Sense, Scottish Philosophy; the Life by Dagald Stewart prefixed to Reid's works (4 vols. 1803); the edition by Sir W. Hamilton (1833); McCozi's Scottish Philosophy; and Campbell Fraser's monograph (1838).

Reigate, a thriving market-town of Surrey, pleasantly situated at the southern base of the North Downs, 21 miles S. of London. Of the castle of the Earls of Warrenne little remains save a grassy mound, with large vales or caverns beneath it. The church, with Transition Norman pilers, has a mainly Perpendicular, contains the glass of Lord Howard of Effingham, is a library (1701) with some curious MSS., and many of Evelyn's books. Other buildings are the public hall (1801) and the grammar-school (1675). Foze the martyrlogist is claimed for a resident; and Arch. Bishop Usher died here. Till 1832 Reigate returned two members to parliament, and then one till 1867. It was incorporated as a municipal borough in 1863. Pop. (1851) 4927; (1891) 18,062; (1911) 22,646.

Reign of Terror. See Danton, Robespierre.

Reiklavik. See Iceland.

Reimarus, Hermann Samuel, scholar and theologian, was born 22 Dec. 1719, at Hamburg. He studied at Jena and Wittenberg, travelled afterwards in Holland and England, and was on his return elected rector of the school at Wissarn, and subsequently professor of Hebrew and Mathematics at the gymnasium of Hamburg. He died there, 1st March 1758. He is the author of the so-called 'Wolfenbüttelsche Fragmente eines Ungejammerten,' first published by Lessing in 1777. These 'Fragmente,' up to that time only known in MS., by a few of Reimarus' most intimate friends, produced the profoundest sensation throughout Germany; since in these works the author, in the boldest and most trenchant manner, denied the supernatural origin of Christianity. Another work in the same direction is his Vorgenommenen Wahrheits- Wahrheiten der Naturlichen Religion; of a miscellaneous character are his Prinzip Wissemirenza, De Vita Priscorum, and his edition of Dio Cassius. See the monograph by D. F. Strauss (1860; 2d ed. 1878).

Reims. See Rheims.

Rein. See Bricke, Riding and Draying.

Reindeer, or Caribou (Rangifer tarandus), a species of deer, the only representative of the genus. It is a native of the northern parts of Europe, Asia, and America, and was introduced into Iceland in 1770. In Caithness it exists till the middle of the 13th century (Harting's Extinct British Animals, 1830). It is by far the most valuable of the deer, for not only are the flesh and skin of much use, but the animal has long been domesticated, especially among the Laplanders. The wild reindeer of Lapland is almost equal in size to the stag, but there are great differences of size in different districts, the largest being generally attained in the polar regions. The domesticated animal is never so large as the wild one, but that of Siberia, and the wild ones much larger than that of Lapland. The reindeer is strong, somewhat heavily built, but yet very swift. The hair is longer in winter, and is gray or brownish in colour. The legs are short and thick, and the broad main hoofs spread out as the animal moves; but in the snow, hoofs, there are two necessary lateral hoofs. The head is carried horizontally, not erect as in other deer. The muzzle of the nose is hairy. The antlers are large and are unique in being possessed by both sexes. Moreover, they begin to appear at an early stage in life, within a few weeks after birth, and at the same time in both sexes, whereas in the other deer, in which only the males have antlers, they do not appear before nine months or more after birth. In the female the antlers are somewhat smaller, thinner, and less branched than in the male, and are retained through the winter until the breeding season in spring, after which they are cast. 'The male, on the other hand,' Darwin notes, 'casts his horns much earlier, towards the end of November.' There is great variability in the antlers; there is a "bez tine" as well as a "large tine" for the peculiar in being either branched or palmate. In summer the Lapland reindeer feeds chiefly on the shoots of willow and birch, while in winter it depends mainly on lichens such as the so-called reindeer moss. It seems that they use both their antlers and their hoofs in removing the snow which hides their food. The animals run swiftly, but not gracefully, taking long sliding strides, and their hoofs snap together as they run. In their natural life the reindeer are gregarious. They migrate from the mountains to the lowlands in winter, and return again in spring, a change in part dependent on the food-supply. Moreover, by leaving the lowlands in spring they free themselves from the gnats and gadflies, which trouble them very seriously. It is said that the Lapps have to move their herds near the coast in the summer if the health of their stock is to be preserved, and sometimes an immense herd will rush in a headlong race to the sea.

In North America and elsewhere the reindeer is hunted for the sake of its flesh, fat, and hide. They are shot or trapped in snow pits. The flesh and fat are used in a fresh state or made into pemmican. The skin is used in many ways—for clothing, bedding, and the like. To the Laplanders the reindeer serves as a substitute for horse, cow, sheep, and goat, but its domestication is not very complete. It constitutes the chief part of the Lapp's wealth, and some possess tame herds of two thousand or more, which feed chiefly in the mountainous regions in summer and in the lower grounds in winter. The animal can maintain a speed of nine or ten miles an hour for a long time, and can easily draw a weight of two hundred pounds besides the sledge. Almost every part of the dead animal is used in some way. The reindeer also yields excellent milk.

Reindeer Moss (Ceramomyxa rangiferina or Ceramomyxa rangiferina), a lichen of great importance to the Laplanders and other inhabitants of the northernmost regions of Europe and Asia, as forming the chief winter food of the reindeer. It is found in almost all parts of the world, but is most abundant and luxuriant in the Arctic regions.
It is common in Britain, growing in moors and on mountains. It covers extensive tracts of Yorkshire, and other very northern countries, making them even in summer as white as snow, and often thus occupies the ground in pine forests. When pine forests are destroyed by fire it soon springs up in its greatest luxuriance. It is a very variable plant, and there are two distinct forms, one cylindrical tubular thallus, with small perforations in the axis. It attains a height of two inches and upwards. The branches of plants which grow together usually mix very intricately into one mass. The importance of this lichen was first brought to the notice of Linnean, and it was observed to reach it by seraping, even when it is covered with very deep snow. It is capable of being used for human food, though its taste is slightly acidic. Its nutritious qualities depend on Lichenin (q.v.).

Reinecke Fuchs. See REYNARD THE FOX.

Reinhenks, Joseph Hubert (1821-96), was born near Aix-la-Chapelle, where he worked in a factory before he studied for the priesthood. In 1842 he was ordained at Beverley, and in 1843, he a strenuous opponent of the infallibility decrees, was chosen bishop by the Old Catholics (q.v.).

Relapsing Fever (also known as famine-fever and seven-day fever) is one of the three great species of continued fever, the two others being typhus and typhoid. It was first definitely described from tropical diseases by Dr. Henderson of Edinburgh and other Scottish physicians about 1842, but it can be traced back with certainty in the records of disease a century farther, when it was prevalent in Ireland and Scotland. During the 19th century it has been met with in those countries in the West Indies, in southern Europe, the countries surrounding the Mediterranean, Australia, the North and South Pacific, etc. and, though never extensively, in North America. Relapsing fever usually begins suddenly with rigor, a sense of chilliness, and frontal headache. Febrile remission occurs in a week or ten days, and pulse usually over 100 per minute; the tongue is coated with a thick moist whitish fur; and the skin is often jaundiced (a phenomenon that never occurs in typhus or typhoid fever). There is severe aching pain in the joints and muscles, and great sleeplessness; but diarrhea, if present at all, usually comes on only towards the end of the first week. After the above-described symptoms have lasted for a period varying from five to eight days, generally on the seventh day, a sudden change takes place. The fever commences with a copious perspiration, which is followed by a rapid falling of the pulse and temperature to, or below the normal, and the patient appears nearly well. But from the fifth to the eighth day of this seeming convalescence a sudden relapse occurs, and all the primary symptoms return; these often run a rather shorter course than before, and again terminate in sweating and in a second convalescence, which is in most cases permanent. The relapse sometimes, however, occurs three or even four times. Death is a rare termination of relapsing fever; and when it occurs it usually takes place at the eighth day of the disease. No important anatomical lesion is constantly observed in the bodies of those who succumb to this disease, except enlargement of the spleen. One form of the disease, however, is much more severe, and very often fatal. It was originally described as a distinct disease under the name of bilious typhoid, and is characterized by more marked involvement of the digestive organs, by the constant presence of jaundice, and by absence or incomplete development of the crisis and intermission. It has now been shown to be really identical with relapsing fever proper. Relapsing fever is generally met with among those living under unfavorable hygienic conditions; it is especially apt to attack a population suffering from insufficient nourishment (hence the name famine-fever), and is seldom met with among the upper classes, or among Europeans residing in the tropics, unless they are brought closely in contact with the sick. At the commencement of the disease the patient will in some cases spreading either directly from the patient to doctors, nurses, &c., or from clothes and bedding to washerwomen, who have suffered severely in some epidemics. It was shown by Obermeier of Berlin in 1873 that an organism (Spirillum, q.v.) is constantly present in the blood of the subject suffering from the disease, and his results have been confirmed by numerous other observers. Moreover, a similar disease has been produced in monkeys by inoculation with the organism, which has also been found in their bodies after death. There can be no doubt, therefore, that this spirillum is the cause of the disease (see GERMAN THEORY OF DISEASE). Though relapsing fever has been abundantly proved to be distinct from typhus, they are often associated in a curious way; epidemics of the two diseases have frequently been observed to occur in the same place either simultaneously or successively.

Treatment. The patient, as in other febrile diseases, must be kept in bed; an emetic at the commencement of the attack is often useful, and aperients may be required; a light but liberal diet should be given. Opiates are frequently necessary to relieve the pain and sleeplessness. No means have yet been discovered for cutting short the disease or preventing relapses.

Relations, Maintenance Of. According to English law, a husband is bound to maintain his wife; if he is not, it is impossible for her to live with him, she has an 'mthority of necessity' to pledge his credit for the necessities of her life. Under the statutes relating to the poor a husband may be punished for deserting his wife, and compelled to provide for her maintenance; the husband of a lunatic wife may be compelled to contribute to her maintenance in an asylum. Under the Married Women's Property Act, 1882, a woman who has property may be compelled to contribute to the maintenance of her husband. A woman is not legally bound to maintain a child; but he may be indicted for not supplying an infant child with necessaries. In like manner a child is not bound at common law to maintain his parents. But the poor-law of 1895 imposes a direct liability on the father, grandfather, mother, grandmother, or children of any person not able to work; and by a subsequent act a man who marries a woman having children (legitimate or illegitimate) must maintain such children. Bastard children are to be maintained by the mother, but the father may be summoned before justices and ordered to pay a weekly sum to the mother, or to a person appointed by the justices. A grandchild is not liable to maintain a grandparent, nor can a man be required to maintain persons related to him only by affinity (as e.g. a sister's or brother's child, or a brother-in-law's child (e.g. a brother or nephew). In Scotland the father, and failing him the mother, is bound to maintain children until they are old enough to earn a livelihood; a father refusing to provide for his child is punishable by fine or imprisonment. Parents have a claim on a child if his father is bound to maintain the indigent parents of his wife during the subsistence of the marriage. The father of an illegitimate child is bound to support it, and if the child is unable to earn a livelihood the obligation may last throughout its life. A husband is, of course, bound to support his wife; if he refuses to
do so she may sue for alimemt, and he is liable to her creditors for alimentary debts. In the United States the laws of the states vary; but the duty to support wife, children, and parents is generally recognized as a social duty, and in many states the law makes a penal offence for a man to abandon wife or children.

**Relative Keys.** See Scale. **Relative Rank.** See Rank.

**Relativity of Knowledge.** The doctrine of the relativity of knowledge is almost a commonplace in some philosophical schools, and is as strenuously denied by others. It is connected primarily with the contrast between the absolute and the relative, or the noumenon and phenomenon, and is one phase of the great discussion as to the relation of knowledge to reality. In its modern form the doctrine has obtained currency chiefly through the speculations of Kant, Hamilton, and Mr Herbert Spencer. Knowledge evidently implies a knowerto a relation between the knower and the object known. Hence it is argued that the object is conditioned by the relation into which it is brought; merely by becoming an object the thing as it is in itself undergoes a change or accommodation. Our knowledge therefore can never yield the reality of the thing-in-itself, but only the phenomenon, the thing as it appears to us. Or, as it is otherwise expressed, in being known the object must conform to the nature of the knowing faculty, the mental constitution or organisation of the knower; we cannot, therefore, conclude, says Hamilton, that the properties of existence are known "in their native purity and without addition or modification from our organs of sense, or our capacities of intelligence." Hamilton's general conclusion is: "Of things absolutely or in themselves, be they external, or internal, physical, or mental, we know them only as inseparable; and we become aware of their incomprehensible existence only as this is indirectly or accidentally revealed to us, through certain qualities related to our faculties of knowledge. All that we know is therefore phenomenal and relative. The thing-in-itself is adopted by Mr Spencer, and made the basis of his theory of knowledge, or rather of what Ferrier would have called his agnosiology, his doctrine of our necessary ignorance: 'The reality existing behind all appearances is, and must ever be, unknown.' In Kant's doctrine there is an asserted subjectivity of the forms of space and time; but it is also based upon the broader consideration that perception can give us 'only the relation of an object to the subject, not the inward essence which belongs to the object in itself.' The empirical schools, which resolve our knowledge into impressions of sense manipulated according to the laws of association, likewise accept in its widest sense, as J. S. Mill points out, the doctrine of 'the entire inaccessibility to our faculties of any other knowledge of things than that of the impressions which they produce in our minds consequent upon them.' But, inasmuch as they in many cases profess a sceptical idealism which denies, or leaves doubtful, the existence of any reality beyond the states of consciousness, their views are less usually associated with the term.

The starting point of the above argument must be conceded by all. Knowledge obviously implies relation; it exists only through the duality of knower and known, this duality being as necessarily present in the case of what is called self-knowledge as in the case of knowledge by self of independent objects. But the upholders of the doctrine of relativity proceed to convert this essential feature of intelligence into a proof of the 'impotence' of our faculties. For the term is used in such a way as to imply a taint or defect in our knowledge. Our knowledge is condemned because it fails to realise a certain ideal. The question arises, however, whether the ideal conceptions are in any sense legitimate or possible. What is this 'reality existing behind all appearances,' this thing in itself that so persistently eludes our grasp? The answer of a sound philosophy would seem to be that this unknown essence or noumenal reality is a fiction, the feature of our own constitution. The essence or nature of a thing is expressed in its qualities or action; the noumenon reveals itself in the phenomenon. The relativists are in the habit of saying that 'we know only phenomena,' thus making our knowledge of phenomena the ground of our ignorance of the corresponding noumenon. It is strictly speaking, it is a misuse of language to say that we know phenomena: the phenomenon is our knowledge of the noumenon. To say that we know phenomena is therefore only a roundabout way of saying that we know, and what we know is the noumenon or thing-in-itself. Of course the contrast between knowing and being is not abolished according to this view: in human knowledge, at all events, the existence of objects is independent of our knowledge of them. It is this contrast between the thing as existent and the thing as known that lends particular weight to the doctrine of relativity. But the contrast only justifies us in saying that knowing a thing is not the same as being that thing; whereas the relativistic doctrine says that, ipso facto, to know a thing is not to know the reality of that thing. Knowledge, in this view, is usefully cast off from knowledge.

Apart from this general line of thought, the doctrine is frequently based upon the large extent to which sensation enters into all our knowledge. In the structure of their sense-organs different living creatures have a different amount of sensation; and there may be a corresponding difference in the image of the world which they make to themselves. The knowledge of every being, it is argued, is thus inevitably conditioned by its organisation, and there is no possibility of arriving at an objective criterion. Man, in the Protagorean form of the term, is the measure of all things; but he measures them only as they seem to him. Such a formula may be interpreted either in a sensualistic and individualistic fashion, as seems to have been done by Protagoras, or in a rationalistic and humanistic fashion, as is seen in the Kantian form of the term. There is a sceptical dissolution of knowledge, for it leaves no common ground on which individuals might meet. Kant, by making space and time, if not the categories also, forms peculiar to the human intelligence, but common to all men, provides for objective truth between man and man, but insists on the merely human and relative character of such truth. Apart from the assertion of the merely subjective character of space and time, which Kant can hardly be said to have proved, it is evident that the relativist argument applies with force to what are called 'boundary qualities,' such as tastes, smells, sounds, and colours. But when we consider the elevated pleasures of which the last two, at all events, are the source, we may well hesitate about pressing the relativistic argument too far, for the things do not always account as bald brute facts, on which intelligence afterwards supervenes, to make what use of them it can. It seems truer to believe that to be known and enjoyed by spiritual beings is the purpose of their existence. The relativity of the world to the human senses and intellect would then form no ground for believing that the image of the world thus obtained was in any sense distorted or untrue. We may rise to higher insight and more perfect esthetic appreciation, but that our know-
Relics (Gr. leptaiwma, Lat. reliquiae, 'remains'), personal memorials of those among the dead who have been distinguished during life by eminent qualities. Under this head fall the remains of objects which derive their value from their connection with our Lord and with the saints; as, for example, fragments of our Lord’s cross or crown of thorns, portions of the dust, the bones, the blood, the instruments of torture, the chains, &c. of the martyrs, the mortal remains, the clothes, the boots, and other objects of personal use of the other saints. With them may be grouped objects to which a certain indirect sacred interest is given by their being brought into contact with the direct memorials of the distinguished dead, as by their being placed on the tombs of the martyrs touched with the relics, or blessed at the shrine or sanctuary of the saints, &c. Reverence for relics developed with the increasing honour paid to Martyrs (q.v.).

The earliest monuments of Christian history connected with relics were the votive offerings of devotion with which martyrs of the faith, their mortal remains, and everything connected with their martyrdom were regarded by their fellow-Christians, and for which Catholics profess to find warrant in many passages of the Old and of the New Testament, as Ex. xxii. 21; Lev. xxvi. 14; xxi. 18; Matt. ix. 20–22; Acts, v. 12–16, and xix. 11, 12. The letter of the Church of Smyrna attest this plainly as to the martyrdom of Polycarp; Pontianus’ Life of Cyprian tells of their stealing the martyr’s body, and carrying it away by night in holy triumph. The Apostolical Constitutions bear witness to the honours paid. Miracles, too, are described as connected with relics. Thus, Ambrose tells of a blind man’s sight restored by his touching the bodies of the martyrs Gervasius and Protasius; and similar wonders are detailed by Gregory Nazianzen. Christian converts, knowing that the possession of relics of the martyrs, and even the occasional touching of them, was regarded as a special happiness. According to Theodoret, even cities were content to share with each other portions of relics, and so connected with this feeling, too, is found a belief of a more meritorious efficacy in the presence or the touch of the relics; and especially there is ascribed by Chrysostom, Basil, Theodoret, and other Fathers, to prayers offered before the relics, a virtue in dispelling or warding off sickness, diabolical machinations, and other evils. Hence we find that altars were erected over the tombs of the martyrs, or at least that relics were invariably placed on the altars, wherever erected; insomuch that the Trullan Council ordered the demolition of all altars in which relics were not placed. Relics, therefore, were sacred and the relics of martyrs was the cross of our Lord, which was believed to have been discovered at Jerusalem by Helena (q.v.), mother of the Emperor Constantine. Minute portions of the wood were attributed to the principal churches; and Cyril of Jerusalem, in a council after the discovery of the cross, describes the precious wood as dispersed throughout the world. According to Rohlani de Flency’s Memoire sur les Instruments de la Passion, 'the total cubic volume of all the known relics of the True Cross is about 5,000,000 cubic millimetres, whereas one cubic millimetre is enough for the execution of a man must have contained at least 180,000,000 or thereby.' The practice of relic-worship, and the feeling on which it was founded, were not suffered to pass without a protest. At quite an early period many abuses and superstitions had crept in, even the Fathers who admit the worship do not fail to condemn; and Vigilantius, in his manuscript, reproved in the strongest terms the excesses to which it was carried, and indeed the essential principles on which the practice rests. He had so few followers, however, that were it not for the reftutation by Jerome of his work against relics we should not have heard of this hostile opinion to the popular view; and it is urged by Catholics, as a proof of the universal acquiescence of the church of the 4th century in the practice of relic-worship, that it was not even found necessary to call a single council to condemn Vigilantius.

The writings of Augustine, of Pelagius, of Nola, of Ephraem the Syrian, of Gregory the Great, and others are full of examples of the miraculous virtue ascribed to relics, and of the variety and the extensive multiplication of sacred memorials of all kinds. Nor was this confined to the orthodox alone; all the different parties within the entire opposition on the Incarnation agreed with Catholics and with one another on this subject, and even the Iconoclasts, at the very time that they most fiercely repudiated the use of images, admitted without difficulty the miraculous relics.

In the age of the Crusades a fresh impulse was given to the worship of relics in the West by the novelty and variety of the sacred objects brought home from the churches of Syria, Asia Minor, and Constantinople by crusaders, by pilgrims returning from Palestine, and by the benevolent operations of the University of Paris, and it is admitted by the most zealous Catholics that at this period many false, and perhaps even absurd and ridiculous relics were introduced, and were successfully commended to the veneration of individuals or individual churches in the West; nor do they pretend to doubt that abuse and superstition found their way side by side with what they regard as the genuine and authorized worship of the church. Nevertheless, with the exception of the Walsenses, Wyclif, and a few isolated individuals, the practice remained unchallenged till the 16th century, when, with the growth of the scholasticism and practices of the Church of Rome, it was utterly repudiated by the Reformers. Catholics, however, allege that the practice, as sanctioned by the church, has nothing in common with the abuses which form the main ground of the objections alleged by Protestants. The Catholic Church uses of relics, as authorised by the church, is to serve as incentives to faith and piety, by recalling vividly to men’s minds the lives, and, as it were, the corporeal presence and the earthly converse of the saints, and thus placing before them, in a more touching manner, the virtues which, in the examples, are held up for men’s imitation. The decree of the Council of Trent connects the subject of relic-worship with the general question of saint-worship, and regards the relics of the saints not as possessing themselves, but as perhaps assisting, even through which God bestows benefits on men.’ The Fourth Lateran Council (1215) forbade the sale or veneration of relics until their authenticity had been approved by the authorities; the Council of Trent renewed the prohibition. In the pastoral Epistle of the Bishop of Rome of 1884, and in any other document of the Holy See (1891), it is expressly stated that ‘the authenticity of no relic, be it the most eminent of the oldest church of Christendom, falls under any precept of Catholic faith.’ Relics are usually venerated in church courts, ‘reliquaries’ set on the altar; they are also carried in procession, and the faithful are blessed with them.

The Greek and other Oriental churches, and most of the Oriental sects, agree with Roman
Relief, as distinguished from 'sculpture in the round,' is one of the oldest forms of mural decoration, and in many cases is a subordinate department of architectural art rather than a branch of sculpture proper. It is low relief (bas-relief, basso-ribo) not to exceed (mezzo-rilievo), and high relief (alto-rilievo) according as the carved figures project very little, in a moderate degree, or in a very considerable degree from the background. The ancient Egyptians practised a peculiar kind of low relief and intaglio combined (see Egypt, Vol. I, p. 237). The walls of Tarsos (q.v.) and Babylon (q.v.) are mostly in very low relief. The Elgin Marbles (q.v.), from the Parthenon of Athens, are the most notable example of high relief. See SCULPTURE.

Relief Churches. See United Presby-TERIAN CHURCH.

Relieving Officer. See POOR-LAWS.

Religion. The term has since the 16th century become naturalised in most European languages. It has even in the Tentric tongues taken the place of the native terms formerly in use. As to its etymology, the derivation from religionis is universally recognised to be inconsistent with phonetic laws; the necessity for assuming the existence of a lost transitive verb ligere, 'to look,' has not been made out. There is a relief (relegere) (Cicero, Nat. Deor. ii. 28), which implies carefulness and attention to what concerns the gods to be the primary signification of the word, is better than that from religare (Lactantius, Just. Div. iv. 28), which refers the origin of religion to a sense of dependence or connection with Deity by the bond of piety, insomuch as the latter does not accord with the way in which the ancient Romans used the terms religiosus and religiosus, and supposes in them a higher conception of religion than they are likely to have possessed. The Latinisation of derivation, however, has not been shown to violate any known linguistic law; and the reason which Professor Max-Müller gives (Natural Religion, p. 35) as 'the real objection' to it does not apply to it at all. It is not 'the fact that in classical Latin religare is never used in the sense of binding or holding back.' Binding or holding back, or behind, or fast, is its common meaning in classical Latin; it is its meaning in Caesar, Cicero, Suetonius, Virgil, Horace, and Ovid. Its only other meaning is to unbind.

General terms equivalent in meaning to religion and often used as synonyms, though not in every case exactly so, are: Enn, as Chinese, Sanskrit, Hebrew, or Arabic, and need not of course be looked for in the languages of uncultured peoples. There is no definition of religion in the Bible, nor any designation or description of it which applies to the heathen religions. The Fathers of the Church therefore very suitably attempted a definition of true religion. The difficulty of framing a correct definition of religion is very great. Such a definition ought to apply to nothing but religion, and to differentiate religion from everything else, as, for example, from imaginative ideation, art, morality, or philosophy. It should apply to everything which is naturally and commonly called religion; to religion as a subjective spiritual state, and to all religions, high or low, true or false, which have obtained objective historical realisation. And it should neither expressly nor by implication exclude any essential element of religion, but express in a general way all that is necessarily included in its nature, indispensable to its notion. Since the need for definitions of this kind was felt,—i.e. since the comparative study of religions began to be cultivated,—many attempts to supply it have been made, but few, if any, of the definitions of religion as yet proposed fulfil all the requirements. Those of Kant, Fichte, Schleiermacher, Hegel, Strauss, Wundt, Pfeiderer, Herbert Spencer, Matthew Arnold, Tyler, John Caird, and Max-Müller have attracted no particular attention.

The classification of religions also presents great difficulties. To distribute them into (1) true and false religions, or (2) natural and revealed religions, or (3) natural and positive religions, or (4) religions of savage and of civilised peoples, or (5) book-religions and religions not possessed of sacred books, or (6) individual religions (i.e. founded by great individual teachers) and national or race religions (i.e. the collective products of peoples or races, the growth of generations), must obviously be scientifically inadequate and unsatisfactory, although such classifications are received by many, and may not be without truth or interest. Max-Müller holds that 'the only scientific and truly genetic classification of religions is the same as that of languages;' and Maurice Vernes that they must be classified according to races. And there can be no doubt that, if religions, languages, and races are properly classified, the classifications will, on the whole, correspond or coincide. Still they ought to be classified independently, from a study of their own proper natures, and a complete accordance of their classifications is not to be looked for. The fact, for instance, that natural religion is not confined to races not limited by language or race, must not be ignored or depreciated. Hegel's classification is very ingenious and suggestive. He distributes religions into religions of nature, religions of spirituality, and the absolute or Christian religion, answering respectively both to the chief stages of the historical realisation of religion, and to the childhood, youth, and manhood of humanity. The religions of nature are represented as including (1) immediate religion (sorcery and fetish-worship); (2) pantheistic religion, which comprehends the religion of the nations (China), polytheism (India), and theism (Brahminism), and the religion of being-in-itself (Buddhism); and (3) religion which tends to freedom, and which is exemplified in the religion of the good or of light (ancient Persian), the religion of sorrow (Syrian), and the religion of mystery (Egypt). The religions of spirituality are held to be these three—the religion of imputation (Hebrew), the religion of beauty (Greek), and the religion of the understanding (Roman). The classification of Von Hartmann is of the same character, being very ingeniously conformed to the needs of his own philosophic system. He brings all religions into a scheme of distribution with the facts. The classifications of Lubbock, Tyler, Spencer, Reville, and Dalviella deserve attention as being based on an extensive and close study of religions, including those vague and rude religions to which it is especially difficult to assign appropriate names. The absence of agreement in the scheme of distribution. No general agreement, however, has been as yet reached either in determining the species of these religions or the order of their succession.

Professor Tiele classifies religions as follows:—1. Natural religions, which comprehend (a) Polytheistic magical religions under the control of animism; (b) Purified or organised magical religions—Therianthropic polytheism, (1) unorganised and (2) organised; (c) Worship of manlike but
superhuman and semi-ethical beings—Anthropomorphic polytheism. II. Ethical religions, which are either (a) National nomistic (nomothetic) religious communities—Taoism, Confucianism, Brahminism, Jainism and Primitive Buddhism, Manichaeism, and Satanism; or (b) Universalistic religious communities—Islam, Buddhism, Christianity.

Religion is virtually universal, although, of course, neither the possibility nor the existence of atheism can be reasonably denied. The instances which historical religion has afforded of a distinction between the two have, it must be noted, not been such as to prove that there are whole peoples destitute of religion who will not stand the test of examination (see Flint, Antithetic Theories, Lecture vii. and Notes xxv.—xxxi., and Roskoff, Religionswesen der rohesten Naturvölker). Not one adequately attested case of the kind has yet been produced; and even if such a case were established it would go only a very little way towards proving that man is not naturally and normally a religious being.

The starting-point of religious development has been variously represented as fetishism (De Breul, Fétichisme), animism (Spantini, La Nature et L'Homme), Caspari, Le Bon), polytheism (Hume, Voltaire, Dupuis), pantheism (Tholuck, Ulrici, Caird), henotheism (Schelling, Max-Müller, von Hartmann), and monothelism (Creuzer, Professor Rawlinson, Canon Cook). All these representations are consistent with the process of knowledge by which we are not enabled to decide what the primitive religion was. Historical research does not take us back to it. Nor does it show us what stages of religion intervened between it and the earliest known historical religions. The problem of which the religious phases of religion are represented by anthropologists and comparative theologians as having succeeded one another are merely more or less suggestive hypotheses, based on data both insufficient and ambiguous. All serial arrangements of the kind have to be regarded as of a merely logical, non-historical and non-chronological kind, although they may, perhaps, aid in leading to a discovery of the historical order of development. Hence the best mode of arranging the religious phases is to begin with the logically simplest phase of religion, and pass on the other phases in their logical order of their logical dependence and complexity. Adopting this principle, Naturism, the worship of natural objects regarded as powers or agents will come first, implying as it does no original or special faculty or tendency, and being the direct and natural interpretation of physical facts. It may have many forms corresponding to the differences of the natural objects, and these forms may imply very different degrees of intellectual capability and very different qualities of disposition in the worshippers, although they have certainly not been shown to be successive stages of religious development. Nature-worship affords a basis for all other forms of religion and worship, and in most of them its presence as a constituent is obvious. It is difficult, if not impossible, to conceive how men would have arisen to worship a special object of religion except by means of it; or how they could have failed to enter it unless raised above it by a special revelation. And the notion of a special revelation to men who had not by natural means acquired any belief in or thought of deity is scarcely conceivable. It has been noted that the growth of the idea of soul is often indistinguishable or difficult to distinguish from nature-worship, which is, as it were, implicit animism, while animism is explicit nature-worship. When there is a distinction between body and life or soul, it is natural that he should work it out in regard to himself, and then judge of other things by himself; and the phenomena of sleep and dreams, of swooning, apoplexy, ecstasy, insanity, and death, all contribute to mould his thoughts when once they have been turned in this direction. Hence a third phase of religion, Spiritism, in which the souls worshipped are human, or at any rate created as the result of a natural process, is received according to human experience, but affected and modified by physical impressions and analogies. The hypothesis of Mr Spencer that religion begins at this stage, the first deities being deceased ancestors, and the first worship funereal rites, takes no account of a vast mass of philosophically natural evidence which establishes that the names of the oldest known gods were descriptive of natural phenomena, and of historical evidence which shows that ancestor-worship has been created in various localities on an older nature-worship. It also rests on a very improbable assumption as to savage man's mode of viewing natural objects worshipped, and fails to explain the common features, similarities, and analogies in the various mythologies, the transformations of the ghosts into gods, the inferior position of properly ancestral gods, and especially the characteristic features of the successive phases of religious development are Polytheism in the special sense of the term, anthropological mythology, the worship of divine individualities, generally in origin nature-gods, but transformed by imagination operating under the belief that beings analogous to things familiar in the order of things. The fifth phase is that in which polytheism is subordinated to, or reduced under, a Dualistic or Monistic conception of the divine. The conception may be mainly reached either by speculative or ethical thought. The sixth phase is represented by the Monotheistic religions—the Jewish, Christian, and Mohammedan. These religions all claim to rest on special revelation. In them only is belief in a plurality of gods entirely transcended. Philosophical monism in a religion does not cast out polytheism. Polytheism, image-worship, totemism, shamanism, and sorcery probably should be regarded not as distinct phases or natural logical stages of religious development, but as adjuncts and incidental perversions of religion which presuppose its normal or logical phases or stages. Insufficient and inadequate proof of this view would necessarily dislodge and destroy a number of current hypotheses.

The theories regarding the psychological origin and the essence of religion are numerous and divergent. It was common among the atheists of the 18th century to regard religion as the invention of individuals desirous of deceiving their fellow men in order to further their own selfish and ambitious views. Feneberg, Lange, Spencer, and others account for its appearance by imagination, illusion, or the misinterpretation of ordinary or exceptional phenomena. Some zealous super-naturalists have argued that it must have originated in a primitive revelation. It may be referred exclusively to the intellectual province of human nature. This mistake, however, is too gross to have been often committed, and sufficiently refuted by the obvious consideration that the measure of religion is not the measure of intelligence or of knowledge. Hegel did not, as is often said, fall into the error of identifying religion with thought, but only emphasised strongly the importance of thought in religion and regarded it as the basis of causality, and Max-Müller the perception of the infinite, as the roots of religion. And it may well be admitted that without both of these intellectual principles religion would be impossible. But are there more than merely conditions of its appearance? The only answer which can be given to intellect is that those who hold that God is known intuitively, perceived directly, apprehended with-
out medium; but both psychology and history, both internal analysis and external observation, seem to disprove this hypothesis. Religion has often been resolved into feeling or sentiment. Thus Lucretius, Hobbes, and Strauss have traced it to the following—the desire to secure life and its goods amidst the uncertainties and evils of earth; the disciples of Schleiermacher to a feeling of absolute dependence, of pure and entire passiveness; and others—e.g. Brinton and Newman Smyth—to the religious feeling as the distinction of primary feeling or a peculiar compounded feeling. Kant represented religion as essentially a sanction for duty, and Matthew Arnold has defined it as 'morality touched by emotion,' 'ethics heightened, enkindled, lit up by feeling.' This great diversity of views of itself indicates what investigation is found to confirm—viz., that religion is a vast and complex thing, an inexhaustible field for psychological study. Almost all the views referred to have some truth in them, and most of them are only false in so far as they assume themselves to be exclusive or when they are incapable of accommodating the whole truth. Hence it is comprehended in a comprehensive way which is so common. Thus understood, the Science of Religions may be said to deal with religion as a phenomenon of experience, whether outwardly manifested in history or inwardly revealed in religious experience. To seek to describe and explain religious experience as far as it can be described and explained without transcending the religious experience itself. Its students have only to ascertain, analyse, explain, and exhibit experienced fact. Were religion a physical fact, to study it merely as a fact would be enough. The astronomer, the naturalist, the chemist have no need to judge their facts; they have only to describe them, analyse them, and determine their relations. But it is otherwise with the students of religion, of morality, of art, of history. They must come to it, therefore, as judges of the phenomena and pronounce on their truth and worth. Experience in the physical world is experience and nothing more; experience in the spiritual world is very often experience of what is irrelevant and impious, immoral and vicious, ugly and degenerate. Has the means already to describe and analyse, accept, and be content with such experience? Even the logician and the aesthete will answer in the negative, will claim to judge their facts as conforming to or contravening the laws of truth and the ideals of art. Still more decidedly must the historian and the student of religion answer. Religion, then, is not completely studied when it is only studied historically. Hence it must be dealt with by other sciences or disciplines than those which are merely historical. What are these, and what are they relative to religion, the writer has elsewhere endeavoured to show.

All the particular theological sciences or disciplines treat of particular aspects or phenomena of religion or in particular ways. Their relationships one another and to other sciences can easily be determined. Further, they must be co-ordinated in a truly organic manner by their due reference to it. When religion is studied not merely in particular aspects and ways, but in its unity and entirety, with a view to its comprehension in its essence and all essential relations, it is the object of the Philosophy of Religion. Although this is a distinct and essential department of philosophy, and the highest and most comprehensive theological science, the philosophy of religion could only appear in an independent and appropriate form when both philosophy and theology were highly developed. It is, therefore, of comparatively recent origin, and indeed has been chiefly cultivated in Germany during the 19th century.

The Hibbert Lectures of Max-Müller, Renan, Kuenen, Rhylos Davids, Sayce, and Rhylos; Max-Müller's Natural Religion and Physical Religion; Tiele's Outlines of the History of Religion, and art. 'Religions' in Ency. Brit.; De La Saussaye's Lehrbuch der Religionsgeschichte; A. Lang's Myth, Ritual, and Religion; Revell's Religions des Peuples non-civilisées, & c., treat of the history of religion. Aliotti's Psychology and Theology, Newman's History and Development of Feeling, Tiele's Religions des Menschen, D. Greenleaf Thompson's Religious Sentiments of the Human Mind, Happel's Antike Altere des Menschen zur Religion, and Uriel's Gott und Mensch deal with the psychology of religion. There remain, however, the works on the history of the philosophy of religion—Pfeiderer's (trans. by Stewart and Menzies) and Pinner's (trans. in part by Hasting); also treatises on Religionspsychologie by Hegel, Krause, Olshott, Tante, Spul, Stölzel, Harzmann, Freudenburg, and Auwenhorst. Of works in English,
see books on the philosophy of religion by Morell, Caird, Morris, Lethe (trans. 1867), and Jevons. Introduction to the History of Religion (1896). There are, besides the relevant paragraphs on religion in the articles on Assyria, Babylonia, Egypt, Babylonian, Greek, Hindu, Japanese, and Chinese religions, various separate articles on the various religions of the world, sects and religions, and a final article on Rationalism.

Rembrandt

Rembrandt is a term much used in the law of England, if the owner of the fee-simple of land, or the freehold of lands, give them by will or deed to A for life, and after his decease to B and his heirs, the interest of B is called the remanent, because, after deducting A's life estate, all that remains belongs to B. A remanent is distinguished from a remainder in the following manner: if the land returns or reverts to the owner himself. Remanents are used in settlements for the purpose of fixing the succession and tying up the property, so far as the law will permit. See Perpetuity.

Remak, Robert (1815–65), physician and physiologist, became a professor in Berlin, and distinguished himself by microscopic work in pathology, and by the medical application of electric currents. He wrote works on the development of the vertebrates and on the medical uses of electricity.

Rembang, a town on the north coast of Java, capital of a residency that has an area of 2860 sq. m. and a pop. of 1,173,380. Pop. 10,000.

Rembrandter, the name 'Rembrandt' was a baptismal name only, which occurs in various forms. Rembrandt's initials were R.H.—i.e. Rembrandt Harmenszoon, or son of Harmen, and his father's full name was Harmen Gerritszoon van Rijn, or Harmen the son of Gerrit, living on Rhine-side. The local indication, van Rijn, is used in deeds after 1600 A.D. Rembrandt is now often called Van Rijn, but never Harmenszoon. At the time of the artist's birth his family was of the lower middle class, and in prosperous circumstances, living at Leyden, and holding property there. From the register of marriages and from a date on an etching, Rembrandt is known to have been born on July 15, 1606, as the true birth date. Rembrandt's father was a miller, and his mother, Neeltjen van Snuytbroeck, a baker's daughter. They had seven or eight children, of whom two died young, Rembrandt being the youngest but one. All the boys were brought up to the law, but Rembrandt, who wished to give him a classical education; but he had no taste for Latin, so he went to learn painting in the studio of Van Swanebruch, probably in his twelfth or thirteenth year. Orlers says that he worked with Van Swanebruch three years. This master name of a good family, and had visited Italy. Rembrandt's next master was Pieter Lastman, but he stayed with Lastman only six months. He probably returned to his father's house about 1623, and stayed there till 1630. Already he had begun to paint old age; there are several pictures of that date representing old people, as well as careful studies. He began his career as an etcher very early, and worked on the famous Vanvoorne and Mercury heads, including his own, also a fine biblical subject, 'Jesus presented in the Temple.' There are no less than thirty etchings for the year 1630, when the artist was only twenty-three. In the same year he migrated from Leyden to Amsterdam, then a picture-export of 100,000 florins, and there he set up a studio and took pupils. Already one of the most industrious and productive artists that ever lived, Rembrandt found time to paint several biblical subjects, besides a number of portraits, and to etch forty plates in the year 1631, whilst his price was raised by a rapid rise in prices. He painted one of his most important masterpieces, 'The Anatomical Lesson,' in 1632, at the early age of twenty-five. He married Saskia van Uylenburgh in June 1634. She was of a good family, twenty-one years old, and the youngest of nine children. The pair resided in a house of twenty rooms on the Herengracht in Amsterdam. There is good evidence that the marriage was happy, and we know Saskia by the portraits her husband made of her. After marriage he continued to be very industrious, even the year of marriage having a harvest of several religious pictures, and many etchings and fifteen etchings. The artist was also in the habit of producing many sketches and drawings. Vosmaer observes that these are either studies from nature or notes taken rapidly, or else embryos of ideas caught as they formed themselves, with a rude pen and a wash, or a few strokes of black stone.

Rembrandt had a daughter, Cornelia, born in July 1638, but she died the month following. A second Cornelia was born in 1640, who also died young, and a son, Titus, in 1641. His father died about 1632, and his mother about 1640, after having been frequently portrayed by her son both in painting and etching. Saskia died prematurely in 1642, after only eight years of marriage. Between the death of his mother and that of his wife, Rembrandt's activity developed itself in the direction of large canvases, portrait, small biblical or genre pictures, and large canvases with figures the size of life. The year of Saskia's death is also that of the famous picture known as the 'Night Watch.' An important branch of Rembrandt's artistic production from 1643 to 1650 was etching, which he continued to practise more or less till 1650, both in etching and painting. After the death of Saskia the domestic life of the artist becomes obscure. In 1654 his servant Hendrickje Stoffels had a child by him baptised as Cornelia, and after her death one Catharina van Vlijck is mentioned in the register as his widow, but it is unknown whether she was a second or a third wife, and at what date her marriage took place. It is not precisely known what were the causes of Rembrandt's bankruptcy in 1656. He was an ardent collector, willing to give high prices, and as his family fell into embarrassed circumstances, it is likely that he helped them. His art, too, became unfashionable; but he did not relax his diligence. His collection fetched only 5000 florins at the sale. Vosmaer believes, however, that he had found evidence of a return to partial prosperity, and that Rembrandt was able at least to rent a commodious and handsome house near the Rozengracht. After continuing to work with constant energy and undiminished power, he died October 3, 1669, following his son Titus, who died a year earlier. Titus left a posthumous
daughter, Titia, and Rembrandt was present at the baptism. He was spared the pain of losing three of his children within ten days of each other. Rembrandt left two children, names unknown.

The genius of Rembrandt has been the subject of much controversy, but his fame has increased, notwithstanding unintelligent censure and praise often equated to his name. Rembrandt's work is not limited to the merits of Italian art, as we know by his collection, but his own practice was founded on the direct study of nature. He saw around him both in human life and landscape. It is a mistake, however, to suppose that he copied marvulously, that he was and must remain classed. Far from this, he was so imaginative that he transmuted everything. He had an equal power of expressing mass and rendering detail both in painting and etching. His technical force in both arts has only been rivaled in other styles, and it has never been surpassed. The conception of Rembrandt for his chiaroscuro is, however, misplaced. The chiaroscuro of Rembrandt is often false and inconsistent, and, in fact, he relied largely on public ignorance. But though arbitrary it is always conducive to his purpose, the effect is heightened by an intentionally unequal distribution of finish. No artist ever combined more delicate skill with more energy and power. His treatment of mankind is full of human sympathy for all ages and conditions, but his especial study was old age. In his interpretation of these pictures he did not seek to give dignity by factitious magnificence or by elevating personages above their social rank, but by inspiring respect for them, and interest in them, as they were. At the same time his artistic faculty of idealisation acted in its own way by giving the pictures of Rembrandt a divine beauty, he is not the most perfect, but he is the most interesting, and his work is full of variety, both in subject and in technical methods. He was a great draughtsman, in his own way, and often a line colourist, as well as a great executice virtuoso both in painting and etching. Rembrandt had much personal influence as a teacher, and many of his pupils became known. His life seems to have been absorbed in work, and he avoided fashionable society, keeping to the burghers and artists.

See the elaborate French Life by his countryman Voasmer (Paris, 1877), the interesting study by Emile Michel (trans. ed. by Wedmore, 1893), and the monograph on the etchings by Ruysch (The Hague, 1876). Of Rembrandt's etchings, the first catalogue of the etchings of Rembrandt is the incomplete one by Gersaint, published after his death in 1751. Peter Yver of Amsterdam supplemented this, and Daniel of Liverpool published a translation in 1786. Adam Bartsch followed at Vienna in 1797. De Graeff published in 1824 an edition of preceding catalogues. Wilson (Lond. 1836) issued a new catalogue with original observations. That by Charles Blanc, in two vols. (Paris, n.d.), includes both pictures and etchings, that by Mr. Middleton (Lond. 1878) gives the etchings only, and a catalogue privately printed for the Burlington Club. In 1877 gave the etchings in chronological order. Voesmer gives the catalogues at the end of his biography, both chronological and classified. Mr. F. S. Hadden's monograph on the etchings (Lond. 1879) proves that some of the plates attributed to Rembrandt were executed by other hands, and that many existing catalogues of Rembrandt's works give about 500 pictures, 600 drawings and studies, and 350 etchings. The bent of his mind may be judged of by the choice of subject. Out of the 1,427 engravings, 495 are from the Old Testament, 255 from the New, 22 from classical mythology, and only 12 from history. There are about 440 portraits and 100 landscapes, besides some sketches of studies and letter-headings. With the single exception of the Bible, Rembrandt got little from books, and his house, so rich in works of graphic art, contained barely twenty volumes.

Remijia, a genus of Cinchonaceae (see Cinchona), valuable as a source of Quinine (q.v.). There are no known species found in Brazil. The name comes from that of the Brazilian physician Remijio.

Remington, Philo, inventor, was born at Litchfield in New York on 31st October 1816. He entered the small-arms factory of his father, and for twenty-five years superintended the mechanical departement of the Remington breech-loading rifles and of the Remington typewriter. This invention was largely due to his inventive skill. He retired in 1886, and died on 4th April 1889.

Remiremont, a town of France (dept. Vosges), stands on the Moselle, 17 miles by rail SE. of Epinal. The remains of an abbey, founded in 620, are the finest building in the town. The abbess was a princess of the empire down to 1566; the nunnery was suppressed at the Revolution. Muslin, cotton, leather factories, and sawmills exist here. Pop. 8447.

Remittent Fever is one of the varieties of fever arising from malaria or marsh-poison—one being intermittent Fever, or Ague (q.v.). It is more bilious and its milder varieties are known as delayed intermittent fever; while in its more serious form it may approximate closely to yellow fever. As the nature of the poison on which it depends is sufficiently noticed in the article Malaria, we shall at once proceed to describe the most characteristic symptoms. The attack may be either sudden or developed by languid insidious febrility, together with a general feeling of malaise. Then comes a cold stage, usually of short duration. This is followed by a hot stage, in which the symptoms are commonly far more intense than those exhibited in the other forms. Coldness preceding the delirium is not uncommon, and is a bad symptom; while in other cases drowsiness or lethargy is one of the most marked symptoms. There is often great tenderness or pain in the region of the stomach, and vomiting—the vomited matter frequently containing bile or blood. A remission of these symptoms occurs, in mild cases, in six or seven hours; but in severe cases the paroxysm may continue for twenty-four hours or longer. The remission is sometimes, but not always, accompanied with sweating. The duration of the remission is considered as that of the paroxysm, varying from two or three to thirty hours, or even longer. The fever then returns with increased severity, and without any cold stage; and then the paroxysms and remissions proceed, most commonly according to no recognisable law, till the case terminates either fatally or in convalescence. In favourable cases convalescence is usually established in about a week. The severer forms of this fever are often accompanied with more or less jaundice, and hence the disease has received the name of bilious remittent fever. It is also known under the name of jungle-fever (q.v.). Its prevalence is on the border of the great American lakes; and the African, Bengal, Levant, Welcheren, and other similar local fevers are merely synonyms of this disease. In England the disease is very rare; and when it occurs it is usually mild. The disease is most severe, and lasts longest, in the Western Indies, Central America, and the West Indies. The first object of treatment is to reduce the circulation during the hot stage. This is done by a douse of grains each of calomel and James's powder, and, after an interval of three or four hours, by a douse of calomel, followed by a draught of the ordinary black draught. On the morning of the following day the remission will probably be more complete, when quinine should be freely and repeatedly administered. A mixture of antimonial
wine with acetate of potash should also be given every two or three hours, so as to increase the action of the skin and kidneys. The patient must be carefully watched during the period of convalescence. A timely removal from all malarious influence, by a change of climate or a sea-voyage, is of the highest importance.

Remonstrance. The, a detailed statement of all the king's illegal and oppressive acts, and a vindication of the rights of parliament, laid before the House of Commons by Pym, and carried by 159 votes to 148, after a stormy debate lasting from noon till after midnight, November 22 and 23, 1641. On the question as to its being printed the debate began anew with such extraordinary exasperation that an actual conflict on the floor of the House was saved only by the calmness and tact of Hampden. On a division a majority of 23 left the publication free and restrained the printing only until further order. The adoption of the Remonstrance was felt on both sides to be a crisis in the struggle between Charles I. and the parliament. It kindled fresh the enthusiasm of the country, and hurled the king into more violent and fatal measures. 'The turning-point of freedom or despotism,' says Forster, 'for two more centuries in England was probably passed that night.'

Remonstrants. See ARMINIUS (JACOBUS).

Remora, or SUCKING-FISH (Echeneis), a genus of fishes sometimes classified not far from mackerels among the Acanthopterygii Teleostei, or referred to a special sub-order Discocoelphi. The great peculiarity is the suctorial disc on the dorsal surface of the head. It is formed from a modification of the first dorsal fin, whose spines have become eft. The sucking-fishes fix themselves very firmly to sharks, sword-fish, turtles, and even to ships. So firmly do they adhere that they are sometimes used in fishing. A line is fixed to the tail; the fish is set free; it discovers a turtle or fish and fastens itself. The fishermen dive after the line if the remora has fastened on to a turtle, or may in other cases simply haul it up. Columbus, or one of his companions, described how the 'Gunaic' shoots 'like an Arrow out of a Bowe towards the other fish, and then, gathering the bag on his head like a purse-net, hold them so fast that he lets not loose till hal'd up out of the water.' More precise details have been furnished by other travellers. Several species of Echeneis or remora are known from the Mediterranean and the Indian Ocean. The remora of the Mediterranean was well known to the ancients, and was credited with many feats, such as that of detaining Antony's ship from the battle of Actium. The fish is palatable, and is sometimes eaten after its day's work of fishing.

Removal of Goods. See LANDLORD AND TENANT.

Remseheid, a town of Rheinish Prussia, 6 miles S. of Elberfeld-Barmen, carries on extensive manufactures of woollens. Pop. (1781) 22,017; (1800) 30,029; (1890) 40,371.

Remusat, (Jean Pierre) Abel, Chinese scholar, was born at Paris, 5th September 1788, studied medicine, and took his diploma in 1813; but as early as 1811 he had published an essay on Chinese literature. In 1813 he was compelled to serve as a surgeon, but in 1814 he was made professor of China in the Collège de France. Of the numerous works that he wrote subsequent to this period we may mention Recherches sur les Langues Tartares (1820), a work in some sort preparatory to his great Éléments de la Grammaire Chinoise (1822). He wrote also on the origin of Chinese writing (1827), on Chinese medicine, on the topography and history of the Chinese empire, and Mélanges (published in 1843). Remusat was the first to make known in Europe the life and opinions of Iou-Tsze. In 1818 Remusat became one of the editors of the Journal des Savants; in 1822 he founded the Société Asiatique de Paris; and in 1824 he was appointed curator of the Oriental Department in the Bibliothèque Royale. He died of cholera at Paris, 31st June 1832, at the early age of forty-four.

Remusat, Charles (François Marie), Comte de, French politician and littérateur, born at Paris, 14th March 1797, the son of Augustin Laurent, Comte de Remusat (1762-1823), who was successively chamberlain to Napoleon and a prefect under the Restoration. His mother (née Claire Elizabeth Jeanne Gravier de Vergennes) was born in 1760, married in 1786, became dame du palais to Josephine, and died in 1821. Young Remusat early developed Liberal ideas, and took eagerly to journalism. He signed the journalists' famous protest against the Ordinances of Polignac which brought about the July revolution, and was in October elected deputy for Toulouse. He now allied himself with the Doctrinaire party, and in 1836 became under-secretary of state for the interior. In 1840, when the government passed into the hands of Thiers, Remusat was made minister of the Interior and signed the resignation of Thiers on the annexation of Lombardy. Exiled after the coup d'état of Louis Napoleon, and henceforward devoted himself to literary and philosophical studies, till, in August 1871, M. Thiers called him to hold the portfolio of Foreign Affairs, which he retained until 1873. He died June 6, 1875. Remusat was a long well-known contributor to the Revue des Deux Mondes.

Among his writings are his Essai de Philosopbie (1842); Ablard (1845); L'Angleterre au XVIII Siècle (1856); studies on St Anselm (1853), Bacon (1857), Channing (1857), John Wesley (1870), Lord Herbert of Cherbury (1874); Histoire de la Philosophie en Angleterre de Bacon à Locke (1875); and posthumously two philosophical dramas, Ablard et La Saint Bertélemy (1878), and Correspondance pendant les premières années de la Restauration (6 vols. 1883-97).

His mother's Mémoires (3 vols. 1879-80) and Lettres (2 vols. 1881), both of which have been translated into English, prove him to be of the greatest interest, and throw a flood of light on the strange society of the First Empire and the character of Napoleon.

Remy, St (Lat. Remigius). See RHEIMS.

Renaissance is a comprehensive name for the great intellectual movement which marks the transition from the middle ages to the modern world; a combination of new thought, included a change in attitude of mind and ideal of life, as well as in philosophy, art, literary criticism, political and religious thought. Substantially a revolt against the barrenness and dogmatism of Medecvalism, the new spirit claimed the entire liberation of reason, and, passionately recognising and studying
the rich humanity of Greece and Rome, aimed at a complete rehabilitation of the human spirit within the frame of studies and arts and graces which invested the classical age. It was an escape—at first hesitating, then triumphant—from a life regulated and confined on all sides by ecclesiastical tradition and intellectual tyranny into joyous freedom and unfettered spontaneity. Zeal for the Renaissance—yet the word is out of place—brought a new ideal of culture, and the new view of life for which the name of Humanism (q.v.) is used. Renaissance, re-birth, was originally used as synonymous with the Revival of Letters, the revived study in a new spirit of the classical languages and literature, and the studies of Greece and Rome in all their depth and breadth, interpreted in their own spirit, and divorced of the narrow traditional limitations. Greek in especial was practically a new discovery, and a vastly important one; but the knowledge of the classics was only one side of the movement which permeated all, transformed philosophy, science, art, and religion. The new spirit powerfully aided in weakening the power of the papacy, in the establishment of Protestantism and the right of free inquiry. Under its impulse astronomy was opened up to the public by Copernicus, and science started on its modern unfettered career; by it, too, feudalism was abolished, and the demand for political liberty began to be raised. Reverence for the Holy Roman Empire and for its ancient rival the papacy was alike decaying; a new sense of nationality was springing up, and national languages began to flourish. To the same general impulse, as causes or effects, belonged also the invention of printing and multiplication of books, new methods of paper-making, the use of the mariner's compass, the discovery of America, and the exploration of the Indian Sea. The fall of the Eastern Empire in 1453 sent swarms of Greek scholars to promote the revival of scholarship already in progress in western Europe. From the nature of the case, it is impossible to fix a definite date for the beginning of the Renaissance; long before the close of the Dark Ages there were isolated scholars and thinkers who anticipated the new light. In its main elements, however, the movement originated in Italy towards the end of the 14th century, and, acquiring its full development there in the earlier half of the 16th, the Renaissance was propagated by itself throughout the rest of Europe: France, Germany, England, and other countries participating later in the movement, which in each of them took a somewhat different shape. But Italy was specially the nursing-mother of the Renaissance.

For the first herald of the Renaissance we may go as far back as Dante (1265-1321), who, with all his mediavelism of conception, yet by the pristine energy and fullness of his poetry was no unworthy follower of his chosen master, Virgil. The first positive impulse, however, in that direction was imparted by Petrarch (1304-74) by his opening the Latin epistolarum of Cicero, and thus suggesting to his Italian friend the old Roman grace, he awoke enthusiasm for the classics by his Latin epic Africa, and numerous epistles and dissertations. In his old age he tried to imitate a little Greek at the extremely sorry sources within his reach, writing his Historia de Vita et Gesta Christiani Rerum, urging Boccaccio to translate the sacred poet into Latin. Boccaccio did not rest till he had piously, though very imperfectly, rendered into Latin both the Iliad and Odyssey. A secretary of Petrarch, Giovanni Malapagno, commonly called da Ravenna, was the first to compose in Italian. In the course of his duties and, wandering as he did all over Italy, communicated the new impulse to distinguished pupils, Barbaro, Strozzi, Poggio, Bruni, who in their turn propagated it anew from Venice, Rome, Mantua, and elsewhere. Luigi Marsigli's house became a private casualty to the revival of all graces and utilities among the young and promising neophytes of Florence. Calzecico de Saintato, who translated Dante into Latin, having been made chancellor of Florence in 1375, introduced into public documents the stately sonorous periods of the classic style, and so rendered it imperative on all princes and gentlefolk of the next age to have trained stylists as their secretaries. A like classic transformation was effected in episodal correspondence by Gasparino da Barzizza, who made a special study of Cicero's letters. The glory of having been the first Florentine to visit Bologna and Paris and to have lived under the sacred Greek belongs to Giano di Scopatia. To Salutato and Pallotto di Strozzi is due the foundation of a Greek chair at Florence; and in 1396 Manuel Chrysoloras, a genuine Greek in the flesh, began his instructions from the Greek chair. Chrysoloras planted schools also at Rome, Padua, Milan, and Venice. In the earlier period of the Renaissance Florence leads the van. The president of the republic, Cosimo de' Medici, himself a scholar, theologian, philosopher, musician, financier, a connoisseur in painting, sculpture, and music, and himself a great patron of the arts, was one of the founders of the Accademia of the Del Medici. Among the most eminent of the scholars of his time, rescued Quintilian from a 'foul prison' and transcribed him, and copied with his own hand MSS. of Lucretius and Columella, while he also unearthed Italiens, Manilius, and Vitruvius. Though for fifty years chanseller in the Roman Curia, he directed the most poignant satires against the church. Vespassiano da Bisticci (1421-98) was probably the last of the mediavel scribes, and the first of modern booksellers; he was agent of Cosimo, Nicholus V., and Federick of Urbino, supplier of all the books of the Curia, of the University of Paris, and of all Italy, and the largest employer of copyists in Europe, whom, too, he personally superintended.

The second period in the history of the Renaissance is distinguished by indiscriminate avilility for everything classic. As its most representative scholar may be cited Francesco Fileippo (1398-1481). Having studied rhetoric and Latin at Padua, he learned Greek at Constantinople, became professor at Venice, Bologna, and Florence, and gained the admiration of all Italy for erudition. In the third period of the fifteenth century came the fame of Lorenzo de' Medici and Politian at Florence, Boiardo at Ferrara, and Sannazzaro at Naples. President of Florence from 1469, and himself of the most versatile talent, Lorenzo de' Medici was, like his grandfather Cosimo, his son Giovanni (Leo X.), and his nephew, Pope Leo X., a constant promoter of all learning. By the consent of all, the most consummate of the humanists is Politian, whose Manto, Ambra, and Nutritia display almost as spontaneously a command of the classic languages as do his Orfeo, Storze, and Rime of his native Italian. A last and, possibly, the briefest stage of erudition began to sink in credit, and the accomplished personages who adorn the fourth period are of a somewhat more independent type—the historians, Giuicciardini and Machiaveli,
the handsome Bembo, the splendid Alberti, Castiglione, the author of Il Cortegiano, and Ariosto, author of Orlando Furioso, the Cinque Canti, and the polished cynical Satires.

Some of the faults of the Renaissance clung to it in all its periods. At one time pelatry threatened to check originality and spontaneity; the worst ancient works were prized more than the best written in any new European tongue. Petrarch valued himself mainly for his Latin works, and thought lightly of his Italian poems. The tendency was established to regard the classics as the one standard of learning and the one instrument of education. A worse fault was that the revolt against medieval religious tradition was accompanied to a very large extent by absolute and anti-Christian immorality and license. Literary and artistic refinement placed no check on brutal lusts and savage passions; though in a few men of high character, Michelangelo, Raphael, Iwo, Miranda, Marsilio Ficino, and others, in whom Humanism did not extinguish the principles of Christianity and morals, a singularly noble and complete humanity was displayed. The culmination of the Renaissance in Italy may be regarded as having fallen within the half century 1456–1506; and its close for the land of its birth may be fixed at the sack of Rome in 1527 by the Constable de Bourbon, followed by the transference of Humanism in its later developments to France, England, and the rest of Europe.

In Germany the change was as marked as in Italy, but the Humanism of Germany and the Low Countries was very different in spirit from that of Italy. Not less tinged by a revived love for ancient learning, it was never divorced from morality and hostile to Christianity; and its most important direct outcome was the Reformation. Biblical and Oriental studies were strenuously cultivated. Amongst the noted leaders were Erasmus, Melanchthon, Rerchlin, and Von Hutten. In the Netherlands and Flanders the new school of painting was a notable development. In France the new delta and rich results in art and letters. Villon, Marot, Ronsard, but above all Rabelais are types of the French Renaissance in pure literature; while within the sphere of scholarship and religious reform we have here the names of the Scaligers, Dolet, Muretus, Cujacius, Salmuis, Cassanbon, Beza, Calvin.

In England Wyelof and Chancce may be regarded as the forerunners of the Reformation and the Renaissance; but the main streams of both these movements reached England contemporaneously. In scholarship the great names are Groecyn, Linacre, Colet, Ascham, and More; but the fullest English outcome of the Renaissance was the glorious Elizabethan literature, with Spenser and Shakespeare, and in philosophy Bacon, as its most noted representative.

RENAISSANCE, in Architecture, the style which succeeded the Gothic, and preceded the rigid classicism of the classic revival in the first half of the 19th century. Under the heading ITALIAN ARCHITECTURE we have traced the rise and progress of the Renaissance; for this was an epoch of its birth. The spread of classical literature during the 15th and 16th centuries created a taste for classic architecture in every country in Europe. France, from her proximity and constant intercourse with Italy, was the first to introduce the new style north of the Alps. Francis I. invited Italian artists to his court during the first half of the 16th century. The most distinguished of these were Leonardo da Vinci, Benvenuto Cellini, Primaticcio, and Serlio. These artists introduced Italian details, and native architects applied them to the old forms to which they were accustomed, and which suited the purposes of their buildings, and thus originated a style similar to, though diverse from, that of Italy.

The Italian buildings, besides many palaces and domestic structures, comprised a large number of churches. St. Peter's being the great model. In France (as in the other countries north of the Alps) the stock of churches was greater than was required. The grand domestic buildings of Florence and Rome were constructed for defence externally, and were founded in design on the old medieval castles, which the nobles occupied within the cities. The domestic architecture of France is rather taken from the luxurious residences of the monks, and the pleasant open villas in the country; so that, although very graceful in outline and in detail, its buildings want the force and grandeur of the Italian palaces.

In the French Renaissance so much are the old Gothic forms and outline preserved that the buildings of Francis I. might at a short distance be mistaken for Gothic designs, although on nearer approach all the details are found to be imitated from the classic. Such are the palaces of Chambord (q.v.)

and Chenonceaux (q.v.) on the Loire, Fontainebleau, and many others. The churches of this period are the same in their principles of design. Gothic forms and construction are everywhere preserved, while the details are as nearly classic as the designers could make them. St. Eustache, in Paris, is one of the finest examples of this transitional style.

From the middle of the 16th to the middle of the 17th century a style prevailed which may be said to exhibit all the varieties of the Renaissance. This style, usually known as that of the time of Henry IV., may be distinguished by the constant use of pilasters, broken entablatures, curved and contorted cornices, arched arches, &,c., all applied so as to conceal rather than to mark and dignify the real uses of the features of the buildings. The Tuileries, wrecked by the Commune, showed all these defects.
Many of the features of this period are imitated in the so-called 'Queen Anne style' of the present time (see below). From this debased style architecture gradually recovered, and during the 18th century a style more becoming the dignity and importance of the Grand Monarque was introduced. The classic element now began to prevail, to the entire exclusion of all trace of the old Gothic forms. Many very large palaces are built in this style; but, although grand from their size, and striking from their richness and luxury, they are frequently tame and uninteresting as works of art. The palace of Versailles (q.v.) is the most

instance, a pure peripteral temple is taken as the object to be reproduced, and the architect has then, as in many instances, produced a style called Jacobean, of which Heriot's Hospital at Edinburgh is a good example; the fantastic ornaments, broken entablatures, &c., over the windows, being characteristic of this style, as they were of that of Henry IV. in France.

The first architect who introduced real Italian feeling into the Renaissance of England was Inigo Jones. After studying abroad he was appointed superintendent of royal buildings under James I., for whom he designed a magnificent palace at Whitehall. Of this only one small portion was executed (see Whitehall), which still bears the name of the Banqueting House, and is a good example of the Italian style. Jones also erected several elegant mansions in this style, which then
became more generally adopted. In the later half of the 17th century a splendid opportunity occurred for the employment of the Renaissance style after the great fire of London. Sir Christopher Wren rebuilt an immense number of churches in that style, of which St. Paul's (q.v.) was the most important. The spire of Bow Church and the interior of St. Stephen's, Wallbrook, are also much admired.

During the 18th century classic feeling predominated, and gradually extended to all classes of buildings. In the early part of the century Vanbrugh built the grand but ponderous palaces of Blenheim and Castle Howard, which have a character and originality of their own. To these of them, or to look like such, and then the architect had to work out the accommodation as best he might. St. Pancras' Church in London is a good example. It is made up of portions from nearly every temple in Greece! Many really successful buildings, however, have been designed under the guiding hand of Renaissance—viz., one in which the classic elements are subordinated to the Gothic disposition, and which is now generally understood by the expression 'Classic.'

Sir Charles Barry was the first to break away from this thrall and, to return to the true system of designing buildings—namely, by so arranging their general features as not only to express the purposes they are intended to serve, but in so doing to form the decorative as well as the useful elements of the edifice. The Travellers' Club-house and Bridgewater House in London are admirable specimens of his design. There are no superfuluous porticoes or obstructive pediments, but a pleasing and reasonable design is produced by simply grouping the windows, and crowning the building with an appropriate cornice.

As already noticed, a similar style of domestic architecture is now being worked out in France; but both there and in England there was a reaction against everything classic, and a revival of medieval architecture superseded that of classic, especially in ecclesiastical buildings. The most magnificent examples of this style are the Palace or Houses of Parliament at Westminster, and the new Law Courts.

The so-called Queen Anne style, common in recent years, is supposed to be founded on the class of design prevalent at the beginning of the 18th century. The buildings erected at that period were of a very plain and simple order, with classic cornices and details, and frequently with large windows, sometimes divided by mullions. There is occasionally a certain picturesqueness in the arrangements which has been made the most of in the modern revived style. The latter, although taking the name of Queen Anne, is far from adhering to the style of her reign, but rather a free use of the elements of the early Renaissance or Elizabethan style. It thus combines much of the freedom of the late Gothic with classic detail, to which is added a copious use of features borrowed from the Renaissance of France and Germany. Many large structures have been erected in this style, such as the Royal Colonial Institute at London, and the new Law Courts at Birmingham. In these buildings the peculiar features of the style are visible—viz., large windows, divided by plain mullions, and a mixture of classic details and Gothic forms. The style adapts itself well to villas and smaller structures, in which the curved gables of the dormers form prominent features.

In Germany, Russia, and every country of Europe the Renaissance came to prevail in a manner similar to that above described in other countries. The picturesque castle of Heidelberg is an early example, and the Zwinger and Japanese palace at Dresden are edifices of the beginning of the 18th century. In the domestic buildings of Nuremberg,
Dresden, and other towns of the north of Germany, many instances occur of the picturesque application of classic detail to the old Gothic outlines. One of the most striking examples of Gothic and classic architecture is that of the cathedral of St. Mark's at Venice, which was begun in the Byzantine Chapel Royal; and the Walhalla, on the banks of the Danube, is an exact copy (externally) of the Parthenon. The finest buildings of Munich are the Picture-gallery and Sculpture-gallery by Klenze, both well adapted to their purpose. The Wood of Italian and Grecian architecture. In Vienna and Berlin there are many examples of the revived Classic and Gothic styles, but the Germans have always understood the former better than the latter. The museums at Berlin, and many of the theatres of Germany, are good examples of classical buildings. The domestic architecture of Berlin is well worthy of notice, many of the dwelling-houses being quite equal in design to those of Paris. Of the other countries of Europe the only one which deserves remark for its Renaissance buildings is Russia. St. Petersburg, as yet, is all that Europe, the one which best merits the title of a city of palaces. From the date at which the city was founded, these are necessarily all Renaissance in character. They are nearly all the works of German or Italian architects, and are unfortunately, for the most part, stunted and widthless. The ornaments of the palaces are chiefly pilasters running through two stories, with broken entablatures, &c., and ornaments of the finest rococo. The New Museum, by Klenze, is, however, a marked exception. In America nearly all the new buildings, of importance, are carried out in the Renaissance style. Many of these are of great size and striking design. The town-hall of Boston may be referred to as one of the most imposing and effective. Another conspicuous example is the new city hall of Philadelphia (q.v.) which was during the period of the Renaissance Painting and Sculpture and all the other arts took their models from the classic remains which were so carefully sought for and studied. All ornamental work, such as carving, jewellery, and metal-work of every kind, follows in the mode. Medieval niches and pinnacles gave place to the columns and entablatures of the classic styles, and the saints of the middle ages yielded to the gods and goddesses of ancient Rome. See Burekhardt, The Renaissance in Italy (Eng. trans. 1875; 2nd ed. 1890); Dater, The Renaissance (1875; new ed. 1888); Michelet's Histoire de France, tome ix.; John Owen's works on the sects of the Renaissance; Symonds, The Renaissance in Italy (5 vols. 1873-86); W. R. Ward, The Italian Renaissance of the Sixteenth Century (1882; 2d ed. 1881); Ludwig Geiger, Geschichte der Renaissance (1881); Villari's Machiavelli (Eng. trans. 1890) and Savonarola (Eng. trans. 1889); Lecoy's History of Rationalism, and his European Morals; Draper's Intellectual Development of Europe; Guizot's History of Civilization; Lady Dilke, The Renaissance of Art in France (1879); Vernon Lee, Empiricism (1884); Leader Scott, The Renaissance of Architecture in England (1883); and books by Pugin, Chubb, and W. F. Anderson (1866); Münz, Histoire de l'Art pendant la Renaissance (1886); books on Renaissance Architecture in England by Gotch and Brown (1862 & sep.); and Blomfield's Art and Industry of Ancient and Modern Architecture, Italian Architecture, and works there cited: as also those on Ariosto, Boccaccio, Bruno, Campiello, Francesc, Huten, Machiavelli, Medici, Petrarch, Politian, Raphael, Raphaeli, Savonarola, &c.

RENAN, Ernest, was born at the little town of Tréguier, in the department of Côtes-du-Nord (Brittany), on the 27th February 1823. In his Souvenirs d'Enfance he has sought to mark the various influences that wrought in him during his childhood and early youth. He was a Breton Celt by his father's ancestry, a Gascon by his mother's; and all his critics have agreed with himself in recognizing in his moral and mental habits the blended characteristics of this double descent. The centre of the life of Tréguier (originally a monastic village) is its minister, and to this atmosphere of the great religious orders he was early brought to these studies which he unceasingly pursued for more than half a century. His father, who was a sailor, died while Ernest was still a child, leaving his widow in straitened circumstances, with the care of one daughter and two sons. To his mother and sister Renan owed a special debt which he has expressly acknowledged in his Memorials of his childhood. It further deepened the religious influences of his native village that he remained there till his sixteenth year as a pupil in its school. All his teachers were priests, and considered them as men of primitive piety and simplicity, but wholly unacquainted with the movement of things outside their own parish. The education they gave was that which had been the tradition in the church for the preceding two centuries. They taught Latin in the old fashion, but above all they taught to turn out good men.

The young Renan gave early promise of his future distinction, and in 1836 he was one of the boys chosen by the Abbé Dupanloup for a place in the Catholic seminary of St. Sulpice, at Paris, conducted by himself on methods entirely his own. The feelings of the boy on this change from the simple life of his Breton village were what might be those of a Mussulman fakir suddenly transported into a crowded boudoir. The one aim of the Abbé Dupanloup in training of the boys under his care was to turn out priests with the accomplishments and temper of mind that would render them effective men of the world, able to serve the church in spheres where her interests could best be furthered. Dupanloup was respected and beloved, but his system, according to his most distinguished followers, whom he afterwards came to regard as a viper he had nursed in his bosom, his system was 'too little rational and too little scientifical.' The boy had from the first been destined for the church, and he proceeded regularly along the course it prescribed. After three years the 'rhetoric' at St. Nicolas du Chardonnet he was entered as a student of St. Sulpice, the great seminary of the diocese of Paris. But before entering that seminary itself and beginning his theological preparation he had to complete two years' course of studies in the university. His next two years, therefore, were spent at Issy near Paris, in the study of such philosophical teachers as the church had approved of and entitled to its approval. Descartes adapted to Catholic orthodoxy, and the 'doctrina' of Bossuet, were the main subjects of study. At the conclusion of his course at Issy he was in all things, personal habits and temper of thought, a docile son of the church; though one of his teachers had already divined the essential tendency of his mind, and had plainly forewarned him that he was not a Christian. But it was at this last stage of his novitiate that was to show what direction he was eventually to take. At St. Sulpice his attention
was mainly turned to the study of Hebrew, and to this study, of his own accord, he added that of German. As the result of these combined studies (for Renan is careful to state that his questionings first came to him from historical and philosophical, and not from metaphysical considerations) the traditional construction of Christianity had begun to crumble. In 1861, Smith and Thirlwall, in their Origin of the Christian Religion and Theology. Among works of its kind it stands alone in literary value, though it is not the only one of its kind. And in 1881 he published his Histoire des origines du christianisme. In 1885, he was appointed professor of the French Academy. Renan married a niece of the famous painter Ary Scheffer. Of the long series of Renan's works, which by their combined learning and literary power made him the first man of letters in Europe, we can here note only those which call for special mention in a summary account of his career. His work as an author began with a paper Sur les langues sémitiques (1847), afterwards developed into his Histoire générale des langues sémitiques (1851). Checked and supplemented as it has been by subsequent scholars, this treatise is still regarded by specialists as having made an epoch in the history of Oriental studies. In his Averroès et l'Averroïsme (1852) he gave one proof among many others of his familiarity with the life and thought of the middle ages. In addition to these and other works dealing at length with special themes he wrote frequent essays, afterwards collected in his Études d'histoire religieuse (1856) and Essais de morale et de critique (1850), which arrested wide attention by their grace of style and originality of suggestion. His European reputation, however, dates only from the publication in 1863 of the Vie de Jésus, which one of his most discerning critics has described as 'one of the events of the century.' With the Vie de Jésus also began what its author regarded as the special work of his life, the Histoire des origines du christianisme. In Renan's conception of the historicism of Christianity, in the true sense of the term, is possible only from the close of the 20th century after Christ. Previous to that period materials do not exist for an adequate narrative based on data that justify a dogmatic construction of the development of Christianity. The tracing of the Christian origins, therefore, must be a work essentially tentative, and one that, justifying con-
RENDSBURG

RENFREWSHIRE

in which they exercised their function as general critics and scholars, he suggests an interesting and evident parallel. Both gave their best years to the work of expounding Christianity; the one vies with the other in the long series of volumes which make the record of their life's labours; the other shrinks from the task of defining his contemporaries; both living in an age of religious revolution were accused by extemne men of undue concession to traditional opinion; and in the work of both it is the element of a many-sided and elusive personality that distinguishes it from the older and more complete. Dated October 2, 1892.

Renan's Histoire des Origines du christianisme consists of the following volumes: Vie de Jesus (1853), Les Apotres (1856), Saint Paul (1867), L'Antechrist (1873), Les Evangiles et la seconde Vibration chrétienne (1874), L'Eglise chrétienne (1877), Marc-Aurèle et la Fin du Monde antique (1880), Index général (1883); the great complement, Histoire du peuple d'Israel (5 vols., 1887-91). Other writings are: La Littérature (1858); Le Livre de Job (1889); Le Cantique des Cantiques (1890); L'Ecclesiastique (1892); Histoire Générale des langues sémitiques (1854); Mission de Phenicie (1863-74); Ethnétique (1872); Nouvelles Études d'Histoire Religieuse (1884); Aventures et d'Avènement (1832); Essais de Morale et de Critique (1859); Mélanges d'Histoire et de voyages (1878); Questions contemporaines (1859); La France Intellecutuelle et Morale (1871); De l'Église (1849); Littérature contemporaine (1876); Drame philosophiques, including Cædian, L'eau de Jeune, Le Prince de Nezi, L'Abbesse de Jouarre (1889); Souvenirs d'Enfance et de Jeunesse (1895); Discours de la Sorbonne (1888); et dernier, the Hubert Lectures (1899) delivered in London, on The Influence of the Institutions, Thought, and Culture of Rome on Christianity; with Victor Leclercq, the Histoire littéraire de France, 18 volumes, with Charles Scheler; and Mme. Sœur Henriette (1895; trans. as Brother and Sister, 1896). For critical estimates, see Sainte-Beuve, Nouveaux Lundis (tome ii.); Scherer, Études sur la littérature contemporaine (tome viii.); G. Monod, Les Mœuvres de l'Histoire (1895). See also Grant Duff's In memoriam (1893) and Mme. Darmesteter's Life of him (1897).

Rensburg, a town of Sleswick-Holstein, stands on the Baltic Canal, 19 miles W. of Kiel, and manufactures of cotton, machinery, and chemicals. Pop. 7,721.

René L., named 'the Good,' titular king of Naples and Sicily, the son of Louis I., Duke of Anjou and Count of Provence, was born in 1499 at Angers. He failed in his efforts to make good his claim to the crown of Naples, gave his daughter in marriage to Henry VI. of England (1443), and ultimately devoted himself to Provencal poetry and agriculture at Aix in Provence, where he died and was buried in 1489. See ANJOU.

Renegade is defined as one who renounces his religious faith and adopts another creed, more particularly one who renounces Christianity and becomes a Moslem; but in a wider sense the word is practically synonymous with the word traitor—those who deserts to the enemies of his country. A few of the more notorious renegades of history may be named. Hippasus, son of Pisistratus, fought with Sparta against his country Athens, and later joined the Persians. Ommaruzzi, the editor of Homer, left Greece and became a Muslim; the same is true of those of Hippus to induce Xerxes to invade Greece. Coriolanus led the Volscian armies against his native city Rome. Julian the Apostate was of course a renegade from Christianity. The Templars were accused, amongst other things, of being virtually renegades from their faith. The Algerine pirates surnamed Barbarossa (q.v.), who in the first half of the 16th century kept the Mediterranean coasts in a state of perpetual terror, were by birth Greek Christians of Mytilene. Henry of Navarre, fourth king of that name in France, renounced the Protestant creed after he ascended the throne. During the Thirty Years' War there was a prominent renegade leader on each side: Count Mansfeld (II.) deserted the emperor and the Catholic cause because the former treated him ill; Pappenheim, the commander of the celebrated dragoons and in the service of Magdeburg, went over from the Protestants to the Roman Catholics. Archibald Campbell, seventh earl of Argyll, was in 1619 declared a rebel for having entered the service of the king of Spain, a Roman Catholic prince at war with Britain. The 'pirates' Paul Jones, who during the war of American Independence ravaged the coasts of Scotland, was by birth a Scotsman. Mazepa, the Cossack chief, fought against his sovereign at Pultowa in the army of Charles XII. of Sweden. The Duke of Riberda, who won his laurels in the service of Spain in the Thirty Years' War, is in the latter part of the 18th century, the era of the Equatorial Provinces of Africa, is a German Jew, who has become a Mohammedan. The redoubtable Osman Digna, who has occasioned so much trouble as the Mahdi's lieutenant between Nile and Red Sea, is stated to be the son of French parentage, his birthplace Rouen, his name George Nisbet (Scotch). In literature, besides plays and novels and poems dealing with persons already named, Massinger's Renegade and Byron's Siege of Corinth may be quoted as works in which renegades play important parts.

Renfrew, an ancient royal, parliamentary, and municipal burgh, the county town of Renfrewshire, stands on the south bank of the Clyde, 6 miles below Glasgow. Its charter of regality dates from 1396, but it was a burgh at least as early as the reign of David II. (1124-53). A knoll called Castlehill commemorates the site of Renfrew castle, the original seat of the royal house of Stewart. Anciently the chief port on the Clyde, it has still a small wharf, but the sea traffic is unimportant. The principal industries are shipbuilding and some extent of the Kilmannoch group of burghs, which return one member to parliament. Pop. (1841) 2013; (1851) 161,091; (1861) 263,574; (1871) 290,790. The surface is irregular; besides the low lands principality, there are hills of various sizes, those of the Clyde, the Black Cart, and the White Cart, with upland pastures and ranges of hills, the highest point being the Hill of Stake (1711 feet) on the borders of Ayrshire.

Agriculture and the breeding of horses and cattle are extensively carried on; dairying-farming is largely practised, owing to the proximity of large towns. Rather less than two-thirds of the whole extent is arable, mainly in pasture or grass crops. The minerals are coal, iron-stone, shale, and lime; copper occurs at Gourock and Lochwinnoch; and in the latter with success. Besides mining and agriculture, numerous industries flourish in various parts of the county, the principal being the manufacture of thread, cotton, and chemicals, print and bleach works, ship building, engineering, and sugar-refining. Renfrewshire is
well supplied with roads and railways, and has two considerable rivers—Greenock and Port Glasgow. It is divided for administrative purposes into two wards, Upper and Lower, with sheriff-substitutes at Paisley and Greenock. There are two parliamentary divisions, eastern and western, each returning one member. Till 1889 part of the seceded burgh of Glasgow was regained within the county. The chief towns, besides those mentioned, are Renfrew, the county town and only royal burgh, Pollokshaws, Johnstone, and Barrhead. Renfrewshire, or at least the western portion, was anciently called Strathclyde, and was the first part of the house of Argyll to be united—1404, not long after the accession of that family to the crown, the title of Baron of Renfrew (still borne by the Prince of Wales) was conferred by Robert III. on his son James; and about the same time Renfrew was disjoined from the sheriffdom of Lanark and made a separate county.

See Crawford's History of the Shire of Renfrew (1716), and Historical Collections of the County (Paisley, 1880; not completed).

Reni, a town of Bessarabia, at the confluence of the Pruth and the Danube. Pop. 6000.

Renmark, a town in South Australia, situated on the Murray, 135 miles ENE. of Adelaide, engaged in grape-growing and other fruit-culture. Pop. 500.

Rennell, JAMES, geographer, was born near Chudleigh, in Devonshire, 3d December 1742, and served first in the navy and then as an officer of engineers in the East India Company's army, rising to be major. As surveyor-general of Bengal he prepared a Chart of the Banks and Currents at the Laccadives (1778); and, having retired (1782), he wrote various works on India, including Memoirs of a Map of Hindustan (1783). In 1786 he published a Memoir of the Geography of Africa, and in 1798 he aided Mungo Park in the arrangement of his travels, illustrating them by a map. Perhaps his most famous work was his Geographical System of Herodotus Examined and Explained (1806). In 1814 appeared his Topography of the Plains of Troy, and 1826 Illustrations of the Expedition of Olympos. After his death—at London on the 29th March 1830—there were published An Investigation of the Atlantic Currents and those between the Atlantic and Indian Oceans (1832), and a Comparative Geography of Western Asia (1831). See the memoir on him by S. Clerk-Mahan (1895).

Rennes (the Conduit of the Redones), the capital formerly of the province of Britanny, and now of the department of Ille-et-Vilaine, is situated at the confluence of those two rivers, 344 miles WSW. of Paris and 51 SSE. of St Malo. A seven days' fire in 1720 destroyed nearly 4000 houses, and the ancient walls have been superseded by pleasant promenades, so that the place wears a modern aspect. Four bridges connect the upper or new town and the lower or old town, and the most noteworthy of the public buildings are the cathedral, finished in 1844, and Italian in style; Notre Dame, with its dome surmounted by a huge image of the Virgin; the archbishop's palace (1672); the stately Palais de Justice (1618–54); the university buildings (1855), with a picture-gallery; the theatre (1783); the Hôtel de Ville, with a public library and the Lyceé. As the focus of main and branch lines of railway between Paris and the north-west of France, and commanding good river and canal navigation, Rennes is favourably situated for commerce; and, in addition to its large dockyard alongside the river and the neighbouring districts, it carries on a considerable trade in its own manufactures, which include sail-cloth, table-linen, &c. Pop. (1872) 48,638; (1886) 62,482. There is a standard history by Ducres and Villeneuve.

Rennet (A. S. rennaa, renna, 'to run') consists of the inner lining of the true stomach (see Digestion) of the sucking-calf. It contains a ferment which causes milk to clot (see milk), called the milk- or rennet-ferment. The rennet is used in the manufacture of cheese, and to a less extent in the preparation of curds and whey or rennet. It is prepared by removing the stomach from the calf as soon as it has been killed, and separating off the lining membrane of the stomach. It is then salted and dried, and will keep for some time in that condition. When used, this preparation of the ferment is still quite active, is softened in water and added to the milk which is to be curdled. For many years past the milk-curdling-ferment has been obtained from rennet in the form of an extract. It is soluble in salt and water, and is extracted from the fresh rennet of the calf, and kept from putrefying by the addition of alcohol. Extracts of rennet thus prepared are extensively used, and may be had at the druggists' stores.

Rennet. See Apple.

Rennie, JOHN, civil engineer, was born at the farm of Phantassie, near East Linton, East Lothian, 7th June 1761. After being for some time a workman in the employment of Andrew Melkie, ingresar of a Tron, he attended the lectures of Robinson and Black at Edinburgh University. He visited (1784) the works of Messrs Boult and Watt at Solo, near Birmingham, and was immediately taken into employment by that eminent firm. He brought his original genius to the firm itself; and so highly did Watt esteem Rennie that he gave him, in 1789, the sole direction of the construction and fitting-up of the machinery of the Albion Mills, London; and the ingenious improvements effected in the connecting wheel-work were so striking that Rennie at once rose into general notice, and abundance of null-work now flowed in upon him. To this branch of engineering he added, about 1798, the construction of bridges, in which his pre-eminent talent and ingenuity displayed themselves. The chief of his bridges were at the Forth Bridge near Kelson (1803), Leeds, Musselburgh, Newton-Stewart, Boston, and New Galloway, with the Waterloo Bridge over the Thames, which was commenced in 1811, and finished in less than six years, at a cost of more than £1,050,000 (see Vol. II., pp. 437–8). Another of his works is Southwark Bridge; he also drew the plan for the London Bridge, which, however, was not commenced till after his death. He superintended the execution of the Grand Western Canal in Somerset, the Pulbrook Canal in Cornwall, the canal between Arundel and Chichester, and, chief of all, the Kennet and Avon Canal between Newbury and Bath; he also drained a large tract of marsh land in the Lincoln Fens. (The Bell Rock lighthouse was almost wholly the work of Stevenson.) The London Docks, the East and West India Docks at Blackwall, the Hull Docks, the Princes Dock at Liverpool, and those of Dublin, Greenock, and Leith were all designed by him, and wholly or partially executed under his superintendence. He also planned many improvements on harbours and on the docks of Portsmouth, Chatham, Sheerness, and Plymouth; executing at the last mentioned port the most remarkable of all his naval works, the celebrated Breakwater (q.v.). He also made great improvements in the diving-bell. He died October 4, 1821, and was buried in St Paul's Cathedral. Of his works the remarkable combination in them of beauty and durability; and though they were
frequently objected to on the ground of costliness, yet in the end the housing utilities more than compensate for this. In person Rennie was of extraordinary stature and herculean strength. See Smiles's Lives of the Engineers (1874).

GEORGE RENNIE, civil engineer, and eldest son of the preceeding, was born in Surrey, January 3, 1791, educated at Edinburgh University, and commenced the practical study of engineering, under his father, in London in 1811. In 1818 he was appointed superintendent of the machinery of the Mint, and at the same time added his father in the planning and designing of several of his later works. After his father died in 1818 Rennie entered into partnership with his younger brother, John (afterwards Sir John Rennie), as engineers and machinery constructors; and during the existence of the firm it carried on an immense business, including the execution of most of the works which had been planned by the elder Rennie and the completion of those which he had left unfinished. Their operations embraced the construction of bridges, harbours, docks, shipyard and dredging machinery, steam-factories, both in Great Britain and on the Continent, and marine engines for war-ships. Their projects included the widening of the Tiber, construction of the Rhenish canal, the iron, drained large tracts of land in the midland counties of England, and superintended the construction of several continental railways. George Rennie died 30th March 1866.

His brother, SIR JOHN RENNIE, associated with him in business till 1843, was born August 30, 1794, was knighted his father's office previous to the construction of Sonthwark and Waterloo bridges, and was knighted on the completion of London Bridge, which he executed from his father's designs. He acted as engineer to the Admiralty for ten years, and, in company with his brothers, contributed to the introduction of the screw-propeller into the navy. He had a wide reputation for all subjects connected with hydraulic engineering, harbour-works, &c., and a list of his important engineering works will be found in his Autobiography (1875). He died September 3, 1874. He was author of British and Foreign Harbours (1854) and a monograph on Plymouth breakwater (1848).

Rent, in common speech, is money paid for the use of land or houses. In political economy it usually means money paid for the use of land; and it is generally taken as a reference to the processes and discussions of economists regarding rent have risen. Economists have generally held it to be the great merit of Ricardo that he elucidated the true theory of rent. Anderson, Malthus, and West had indeed enunciated it before, but the classical statement of it (fully developed in his Principles of Political Economy, 1817) came from Ricardo. According to that theory the amount of rent paid represents the excess of the price of the produce of the land over the cost of production on that land. The cost of production includes the usual wages paid to the laborers, interest on the capital invested in the cultivation of the soil, and remuneration of management. In other words, after the laborer has been paid the usual wages and the farmer has received the usual return for his capital and trouble from the produce of the land the remainder is rent.

It will be seen therefore that the amount of rent depends on the price obtained for the produce. Rising prices for agricultural produce mean rising rents. And in this, as in other departments, prices depend on the relation of demand to the supply. A country whose population is growing rapidly, and those of the rapidly growing population, and a supply that cannot nearly keep pace with it will lead to a great rise in prices. Such was the condition of England at the end of the 18th century and the beginning of the 19th, when a rapidly growing population had to depend almost solely on the home market, prices have fallen and also rents. The demand has increased, but the supply has increased vastly more, and in spite of the growing population rents have fallen. The general truth however remains that rent depends on prices, and not prices on rent, as is taught by the Ricardoian formula, which, however, is not a satisfactory expression of the fact, rent is not an element in the price of corn.

After having been much overrated as a discovery in political economy, the Ricardoian theory of rent is now in many quarters unduly depreciated. It still remains generally valid under the conditions contemplated by its exponent. Those conditions are a system of land-holding by private owners who do not cultivate their land, capitalist farmers, and free labourers; the rotation of the three classes to exclude any existence of rent. In other words, the economists who have worked out the theory have had in view England, and other countries in so far as they are similarly circumstanced as England. But even in England there are many things which greatly modify the operation of the principle—the influence of custom, the natural conservation of all classes, local attachment on the part of the farmer and labourer, &c. Very important also is the fact that many of the landlords have regard to social and political considerations, as well as to reasons of fairness and economy in the distribution of their property; and it is remembered that a disturbance in agricultural prices, such as that caused by the introduction into European markets of the enormous supplies from America, may have rendered the Ricardoian theory ludicrously inapplicable to the rents actually paid, particularly under long leases. Under these circumstances rent was often paid not out of the surplus of the farmer's profits, but out of his capital. The Ricardoian theory of rent therefore formulates a tendency which, even under the conditions contemplated, accords with facts only in a rough and general way.

When we consider economic history and the existing economic conditions of the world we may perceive how limited in scope the Ricardoian theory of rent has been. In many countries custom has decided, and still decides, the rent paid for land. In very many countries it has not been either competition or custom that has regulated rent, but the owner has wrung from the cultivator all that he could. The only limit to the extactions of the owner has been his own pleasure or caprice or the endurance of the cultivator. In countries, however, where the state is the owner of the land, rent may more correctly be regarded as a tax.

The rent paid for land occupied by towns and that paid for mines are in some important respects different from the rent of agricultural land. The rent paid for land in towns is much more directly influenced by the diminishing returns by increase of population and growth of prosperity. Immuch as the owner receives great advantages from such causes while contributing little or nothing, economists of standing maintain that such land should be under municipal ownership and control. The rent paid for minerals is generally obtained by the owner as long as the mines become exhausted, while the agricultural properties of the soil are permanent in the main. As regards rent generally, it should be repeated that economic formulas are of comparatively little
value. The main thing is a thorough knowledge of the facts and conditions, which vary continually according to the time and country with which we are concerned. For other aspects of rent, see also Land Laws, Landlord and Tenant.

**RENTON**, a burgh of Dumfriesshire, on the right bank of the Leven, 2 miles N. by W. of Dumfarten. Founded in 1752, it has a Tusean column (1774) to the memory of the novelist Smollett, who was born close by, and it carries on malico-printing, dyeing, and bleaching. Pep. (1831) 1860; (1881) 4459; (1891) 5458.

**Renwick, James**, last of the martyrs of the Covenant, was born at Moniaive, Dumfriesshire, 16th February 1662. He attended Edinburgh University with a view to the ministry, but was denied his degree, as he refused the oath of allegiance; and, after witnessing the deaths of Cargill and others of the martyrs, he resolved to embrace the cause for which they suffered. He was chosen by the 'Societies,' as the bands of men devoted to the Covenant were called, to proceed to Holland to complete his studies in 1682, was ordained at Groningen in 1683, and at once proceeded to Scotland, where a sermon was preached at Darnedd Muir in the same year. His life was now exposed to great hazards; he was obliged to move from place to place, and was often reduced to great destitution. In 1684 he published his Apologetic Declaration, for which he was outlawed. When James II. came to the throne in 1685 Renwick with 200 men went to Sanguhar, and published a declaration rejecting him. A reward of £100 was offered for his capture, he was hunted from place to place, and made many hairbreadth escapes, but was at last captured in Edinburgh. He was condemned and executed, 17th February 1688.

See Shield's Life, Renwick's Choice Collection of Sermons, &c. (1777), Simpson's Life of Renwick (1843).

**Renwick, James, LL.D., author and physicist**, was born at Liverpool in 1750, and graduated at Columbia College, New York, in 1807. In 1820 he was made professor of Chemistry and Physics in that college, a position he held until 1833. In 1838 he was appointed by the United States government one of the commissioners to explore the line of the boundary between Maine and New Brunswick. He published a number of books and treatises, Outlines of Natural Philosophy (1822-23), the first extended work of its kind published in the United States, a Treatise on the Steam-engine (1830), several books on Mechanics, and Lives of De Witt Clinton, Jay and Hamilton, and others. He died 12th January 1863.—One of his sons, James, was architect of Grace Church and St. Patrick's Cathedral, New York; other notable buildings from his designs are the Smithsonian Institution, Vassar College, &c.

**Repairs** is the legal as well as popular term to denote the repairs done to a house or tenement by the landlord who is the owner of the lease. In England the burden of repairs is at common law thrown on the tenant, so that, unless the lease expressly say that the landlord is to do the repairs, the tenant will be bound to use the premises fairly and to keep the house property, and to repair to the best of his ability the defects which he is to do the repairs. In the lease of farms the tenant is bound only to keep the house in repair, and not the out-buildings, though he is bound to keep the fences in repair. If the landlord is bound to do the repairs, and fails to do them, he is entitled to quit the premises on that account, though he will be entitled to sue the landlord for damage caused by the want of repairs. In Scotland the landlord is bound at common law to put the premises into tenantable repair at the commencement of the lease. The tenant is then bound to keep them in ordinary repair, but not to keep them in repair where some hurricane or extra ordinary cause destroys them. In the United States the laws of the states vary; in several states it is enacted that a general promise to repair shall not bind the tenant to rebuild in case of destruction by fire.

**Repeal.** See O'Connell.

**Repealing Rifle.** See Rifles.

**Repentance, Stool of.** See Stool of Repentance.

**Replevin, in English law, is a form of action by which goods which have been seized under a distress are taken back (security being given to the amount for which the goods were distrained), and the action of replevin commenced, to try the legality of the seizure.**

**Reporting, an important branch of journalism, has already been incidentally discussed at Newspaper; the methods by which, as a rule, it is practicable are dealt with at Shortland. Here some account of the history of parliamentary reporting, in many respects the most important, is given.**

Accounts of single speeches, and, at times, of entire debates in the English parliament, have come down to us from a very early period. The earlier volumes of the Journals of the House of Commons contain short notes of speeches; the later volumes record nothing but the votes and proceedings. See Symposium. D'Ewes edited the Journals of Queen Elizabeth's Parliaments; and the Commons' Journals contain notes of speeches in the parliaments of James I. Rushworth, assistant-clerk in the Long Parliament, 1640, took down in a species of shorthand any speech of importance; and his account of Remarkable Proceedings in Five Parliaments forms one of the most valuable portions of his Historical Collections. During the reign of William III. a member now and then sent a copy of his speech to the newspapers, for printing which, however, they were sometimes called to account. In the reign of Queen Anne a monthly pamphlet, called the Political State, gave an outline of the debates in parliament. In the reign of George I. the Historical Register, published annually, professed to give reports of parliamentary speeches. In 1824 the Edinburgh Magazine began a monthly publication of the debates, the number for August 1735 containing a report of the debate in the House of Lords on the previous 23d January. Cave, the publisher, continued the practice in succeeding numbers, and his systematic proceedings are thus described by Sir John Hawkins: 'Taking with him a friend or two, he found means to procure for them and himself admission into the gallery of the House of Commons, or to some concealed station in the other house, and there they preserved by dictation the almost entire speeches, and the general tendency and substance of the arguments. Thus furnished, Cave and his associates would adjourn to a neighbouring tavern, and compare and adjust their notes; by means whereof, and the help of their memories, they put down the substance of the several speeches, and the general tendency and substance of what they had lately heard and remarked. The reducing this crude matter into form was the work of a future day and an abler hand—Guthrie, the historian, whom Cave retained for the purpose.' There was, however, no publication of the debates during the sitting of the Houses; parliament was always prorogued before anything said in the course of the session was given in the magazine. At first the names of the speakers were cautiously indicated by the first and last
letter only, and in many cases the speaker's name was wholly omitted. Growing bolder by degrees, Cave printed the name at length. The House of Commons followed the same example. The publication of the debates of either House had been repeatedly declared to be a breach of privilege—as by the Commons in 1688 and by the Lords in 1698. The Commons followed up several previous resolutions to the same effect by ordering, in 1728, 'that it is an indignity to, and a breach of, the privilege of this House for any person to presume to give, in written or printed newspapers, any account or minute of the debates or other proceedings; that upon discovery of the authors, printers, or publishers of any such newspaper this House will proceed against the offenders with the utmost severity.' In 1738 Speaker Onslow called the attention of the House to the breach of its standing orders by Cave and others; and the result was another thundering resolution against the publication of debates 'either while parliament is sitting or during the recess,' and a threat to proceed against offenders with the 'utmost severity.' The reports, notwithstanding, still appeared, but under the disguise of ' Debates in the Senate of Lilliput,' in the Gentleman's Magazine; and ' Debates in the Political Club,' in the London Magazine. Dr Samuel Johnson was one of the more prominent part of this parliamentary debates, and the reports from 1740 to 1743 are held to have been entirely prepared by him, sometimes with the assistance of the above-mentioned Guthrie. When it was observed to Johnson that he dealt out reason and eloquence pretty equally to both parties, he remarked, 'I took care that the Whig dogs should not have the best of it.' It was not till thirty years later that the parliamentary debates descended from the magazines to the newspapers. The latter had, however, for some time resolved to report the debates, and they took advantage of the popular excitement arising out of the Lintrell-Wilkes election for Middlesex to try the right of the House to interdict the publication of its proceedings.

The ever-contestable contest between parliament and the press began at the close of the year 1776. The London Press, in their resolutions following the threat by prompt action; and the Lord Mayor of London and Alderman Oliver were sent to the Tower for refusing to arrest some printers of reports on the warrant of the Speaker, John Wilkes taking an active share in the controversy. The House of Commons loudly protested against the arbitrary proceedings of the House, and the whole country responded to the appeal. The power of parliament to imprison ceases at the end of the current session, and on the day of prorogation, July 23, the Lord Mayor and Alderman Oliver marched out of the Tower in triumph, and at night the city was illuminated. Next session the House of Commons tacitly acknowledged itself beaten. The printers Delhi the House, continued to publish their proceedings, and slept, notwithstanding, secure in their beds. In a short time the House of Lords also conceded the point, and the victory was complete; though it is still in the power of any member, who may call the Speaker's attention to the fact that 'strangers are present,' to exclude the public and the reporters from the House. This power has frequently been exercised during living memory, has been used in an occasion, or by any member who has dissented from this course have taken notes of the speeches, and have avowedly sent them to the newspapers.

Roussé (Fr.). This term is applied to a peculiar method of ornamenting metal which resembles Embossing (q.v.). Briefly stated, it is metal-work formed in relief by striking the sheet, usually a thin one, from behind with hammer or punch, the rough forms so produced being afterwards chased or otherwise finished. After the parts which require to be convex are 'raised' from the back or inside of any object, such as a vase or flat dish, it is either filled with or placed on a bed of pitch and then worked upon the punch, and afterwards chased or otherwise finished. Stamping produces work somewhat similar in general appearance, but of a much more mechanical nature, since the die used determines exactly the pattern, and no variety is obtained. See Direct and Repousse, one kind of hammered iron, again, such as open ornamental gates and grilles, are examples of forging
that of repoussé. Among the best existing pieces of ancient Greek bronze sculpture some have been beaten up (not cast), and are therefore of the same kind as those objects of which the relief is a true artistic sense) in France about the middle of the 19th century. Some of the finest modern works in repoussé have been executed by Antoine Véchta and Morel Ladeuil. One of the largest objects ever produced in repoussé in England is the Elelo Volunteer Challenge Shield. It is of iron, 6 feet high, and was designed by F. Watts, R.A. Elaborate work in repoussé is necessarily very costly, especially if the metal employed is hard, such as iron, copper, or silver, which is usually the case when important designs are to be executed. But the process is also applied in Birmingham to decorate comparatively cheap articles in Britannia metal, which is soft and easily worked.

Representation, in politics, is the function performed by the elected members of legislative and administrative bodies. Ancient democracies were tried by lot on important questions of government by the whole body of citizens; at Athens, for example, all important questions were decided by the vote of the Ecclesia. In England, as in many other countries, the freemen of towns and small districts elected their own officers and managed their own affairs; the sheriff of the early times was attended by the reeve and four men from each township; it was, in fact, a representative assembly, properly so called. When the smaller kingdoms were united under one head the change was not at first favourable to popular government; it was impossible in those days to bring together representatives from a wide area; and the conduct of national affairs fell into the hands of the king and his councillors and the great men of the realm. But feudal custom required that a superior should consult his vassals, or that he should consult levies on the country; under the influence of this idea courts or assemblies of a more or less representative character were formed throughout western Europe. In England the high court of Parliament (q.v.) was originally based on feudal lines in the neigh-bouring parliament of Scotland; but the principle of representation was applied as early as the 13th century to the shires and boroughs of England generally.

In framing or criticising the constitution of a representative body we encounter practical questions of considerable interest. We have to determine, first, who ought to elect, whether a property qualification should be required, whether owners of property should have more than one vote, whether manhood suffrage, household suffrage, or a franchise based on wealth or education, or a combination of the two, should be used, and whether women ought to be allowed to vote. We have then to consider how the electors are to be grouped. The scheme of single-member districts adopted in 1884-85 in the United Kingdom represented all house minorities; local minorities are excluded, and votes may be so distributed that a majority of members is returned by a minority of electors. Mr Thomas Hare (1806-91) was the author of a scheme of proportional representation, in which the whole country is treated as one constituency, each elector has one vote, and any candidate obtaining the necessary quota of votes is elected, while provision is made for transferring votes from a candidate who obtains more than the quota by enabling an elector to vote for several names in the order of his preference. It is contended that this plan, if adopted, would make the House of Commons a perfect model of democratic representation, but it has not yet attracted any great amount of popular support. After the lapse of about a century the one man, one vote' shibboleth of Major John Cartwright (1740-1824) has been recently revived. In school board elections the voting for representatives is cumulative; the voter has a right to as many votes as there are members to be elected, and may give all his votes or as many as he chooses to one candidate. Passing from election law, we have to consider what are the duties of elected representatives, and what should be their relation to their constituents. Should they be paid? Should they have a long term of office, that they may learn their business, or a short term, that they may never forget their dependence on the electors? Are they delegates, bound to act on the instructions of those who appoint them, or is it their duty to act on their own judgment, and to do what is best for the general welfare? The accepted theory in England is that a member is not a delegate: his constituents have no power to withdraw their mandate, and the member is bound to act on his own judgment. But the highly organised parliaments of the western democracies, which have been maintained by the vote of the individual, have given freedom to the individual representative; he can only secure election by pledging himself to vote with his party on certain issues.

For a full discussion of these and other questions, see J. S. Mill, Representative Government (1861; new ed. 1884); T. Hare, The Election of Parliamentary Representa-
tives (1859; new ed. 1865); Walpole, The Electorate and the Legislature (1881). Many interesting political experiments are described in Bryce's American Common-wealth (1888); see also the report of the joint commission of the United States, see Congress, President, United States. Representation was not the original system even in republics (see Republic), but direct voting of all citizens; this old system is still practised in some of the smaller cantons of Switzerland (q.v.).

Reproyle (Fr. reprendre, 'to take back') is the suspension of punishment for a crime, and is used chiefly in connection with capital crimes. The power of reprieve is exercised in two ways: the sentence is stayed by the judge, whereupon the prisoner is released pending the hearing of the case, or until the court shall determine whether he is guilty or not; or, a verdict has been passed against him, and the judge may, on his own motion or on the application of the prisoner, give him an opportunity to show that there is no cause for the sentence, and may, if satisfied of this fact, either discharges him, or acquit him, or reduce the punishment. If this is not done, the prisoner is brought to the execution of the sentence. If he be found guilty his name is placed on the list of ex-reprieved. When he is found innocent the judge states his reason for the sentence, which is published.

Reprisal is repeated taking, from an enemy, goods which he has seized, as a retaliation for the seizure of goods from him of other goods, the equivalent of the damage he has sustained. Letters of Repreisal are the same as Letters of Marque. See Letter of Marque.

Reproduction. See Predestination.

Reproduction is the term applied to the whole process whereby life is continued from generation to generation. One of the characteristics of life is
its continuity; the races of animals and the orders of plants live on without marked change for centuries; by slow modifications they may enlarge or diminish, become impoverished, increased or thinned, but there is no breach of continuity. All the forms of life seem to evolutionists like twigs on one many-branched tree; they are genetically related by near or distant bonds of kinship, and in a very real sense each generation is continued with those which came before and after. As an evergreen tree replaces by fresh growth those leaves which it loses, so, throughout the world, by various forms of reproduction the continuance of life is secured. As reproduction is a fundamental fact of life, it cannot be discussed apart from other facts, such as growth, at the limit of which reproduction usually occurs, or development, in which the germ grows into the likeness of its parent, or the occurrence of two sexes producing complementary and mutually dependent reproductive elements. A theory of reproduction must be consistent with the facts of growth and development, and merge into theories of sex and of heredity—the latter being based on a study of the precise relations between successive generations. See Embryology, Heredity, Sex.

Modes of Reproduction.—Separated fragments of a sponge or cuttings from eutrochial worms, buds of a hydra, or the bulbs of a lily, the eggs of birds, and the seeds of plants are alike able to grow into new organisms; and thus we see that the common fact about all kinds of reproduction is that parts of one organism are separated from the parent life, either as buds or daughter-cells. The formation of many daughter-cells or spores is more than ordinary division taking place repeatedly in rapid succession, and within the substance of the parent-cell—in other words, in limited time and space.

We have seen that reproduction begins among the single-celled plants and animals. There may be found an organism-like Schizomus, multiply- ing by breakage or reproducing by rupture, presumably when the cell has overgrown its normal size; in others numerous buds are liberated at once, as in Arcella and Helomyxa; in many, familiarly in the yeast-plant, one bud is formed at a time; in most the cell divides into parts, and these divide again and again. The formation of many daughter-cells or spores is more than ordinary division taking place repeatedly in rapid succession, and within the substance of the parent-cell—in other words, in limited time and space.

Few plants, like the liverwort and the tiger-lily, a kind of bud may be detached, and thus begin a new life; but among animals the liberation of buds is best illustrated, for this mode of reproduction occurs in hydras and many hydroids, in some 'worms,' and in Polyzoa, and even in animals as highly organised as Tunicates. Budding is usually exhibited by comparatively simple and by sedentary animals, and seems limited to be natural to vegetative organisms. It is easy to understand why asexual reproduction is among many-celled animals always associated with sexual reproduction, and entirely replaced by it in the higher forms. For budding is only possible when the organism is not very large; and then part of the body retains many indifferent units; moreover, it is an expensive way of securing the continuance of generation, and is without the advantage to the species which undoubtedly results from the mingling of two life-currents in sexual reproduction.

Sexual reproduction in its fully differentiated form involves (a) the distinctness of two parent organisms, (b) the formation of two different kinds of reproductive elements—e.g. spermatozoan produced by the male and ovum by the female, and (c) the fertilisation of ovum by spermatozoan. Moreover, the process of sexual reproduction also includes the sexual union of the two parents, or other ways in which fertilisation is secured, while in some cases the fertilised ovum develops in organic relation with the mother-organism, from which it is eventually separated as an embryo. But, while many organisms exhibit fully differentiated sexual reproduction, and while the essentials of the process are always the same, there are not a few important variations in detail—witness the occurrence of hermaphroditism, parthenogenesis, and alternation of generations, the first and last of which are discussed in separate articles.

Physiology of Reproduction.—All growth is, in a certain sense, the nature of reproduction. It is an increase in the amount of protoplasm and its attendant train of substances. Abundance of food material and conditions favourable to rapid assimilation are necessarily accompanied by rapidity of growth; but in the most favourable circumstances there is an inevitable limit to the growth in size of a single cell. It occurs when the rate of assimilation of the constantly increasing mass of protoplasm becomes equal to the rate of absorption of materials for assimilation. Since absorption can only take place through the surfaces, and since, with any given figure of cell, the ratio of volume to surface is a perfectly definite one, and one which increases at a definite rate as the cell grows, there must be for any given figure of cell a perfectly definite limit of size. For any mass of cells arranged in any manner there must be, for similar reasons (though other factors, such as weight, &c., may be operative and varyingly important), a definite limit of size. When in the single-celled animals this limit is reached, or is nearly reached, they cease growing and become germinants. The greater the size of the cell the less rapid, in proportion to volume, must be the absorption, unless at a certain point other factors at present unknown occur—then division of the cell takes place, by which means, the volume remaining the same, the surface of each daughter-cell is increased, and the cell is replenished so that the rate of absorption to surface and therefore of assimilation to absorption is lowered, and growth is once more possible. This law (first clearly stated by Spencer and by Leuckart) is evidently the expression of a factor concerned in the initiation of cell division and growth, and in the regulation of the size of cells. In the Protozoa, then, reproduction is related to, and in a certain sense caused by, a diminution in the possible rate of assimilation, which, to the
protoplasin concerned. It bears the aspect of an
impaired cellular differentiation. The Metazoan, although repro-
duction is not so entirely a matter of cell
division as in the Protozoa, a connection between
nutrition and reproduction is observable. The
common hydra, with an abundant food-supply and
favouring circumstance, grows rapidly, the growth
largely due to the fact that the larva can pass
through the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
take the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
take the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
take the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
take the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
take the form of the production of numerous
buds, which may themselves produce a crop of
secondary buds. But if the conditions become less
favourable to nutrition through the lessenings of the
supply of food material, or, in terms of the
metazoan, in the case of the larva the steps
involving the production of numerous buds, may
...
sole source of transmissible variations in many-celled animals.

In the individual life the antithesis between the reproductive system and the nutritive functions has many expressions, and in terms of this antithesis not a few lines of variations can be rationalised. Thus, the shortening of the axis of the flower seems to be the result of a check imposed upon the vegetative system by the reproduction function; thus, the development of gymnosperms and angiosperms suggests a continuous subdivision of the reproductive carpellary leaf; thus, in almost every natural alliance of phanerogams may be read a contrast between more and less vegetative types, such as is seen within the limits of a single species in the transitions between the leafy kale and the cauliflower. Among animals the antithesis is expressed in different ways—as in the varied degree in which the reproductive individuals of a hydroid colony are differentiated from the nutritive members.

In considering the evolution of animals great importance is always—and rightly—attached to the self-preserving struggles and endeavours which secure the satisfaction of nutritive needs; but the species-maintaining activities of reproduction have been not less important. Thus, Darwin insisted on the dual selection as a fact in evolution, and, though the criticisms of Wallace and others have lessened the cogency of Darwin's argument, there can be little doubt that courtship has aided in the evolution of the psychical life of animals. Romanes, too, in his insistence on the importance of isolation, recognizes 'the reproductive factor in evolution.' For by variations in the reproductive system a species may be divided into mutually sterile types, which, prevented from intercrossing by this physiological barrier, are free to develop along divergent paths. In a variety of connection, Robert Chambers emphasized the importance of 'prolonged gestation,' and Fiske has directed attention to the progressive influence of prolonged infancy, while Miss Buckley has well pointed out that an increase of parental care and sacrifice as seen in birds and mammals has surely been factored in, if not as a result of, the general ascent of animals.

The increase of reproductive sacrifice which we observe in the evolution of mammals and in the progress through oviparous monotremes, prematurely-baring marsupials, and various grades of platybery in the growth of parental care, and the frequent subdivision of self-preserving to species-maintaining ends; and finally, the rise of sociality from foundations based in organic kinship, are well-known facts of animal life which suggest the importance of the reproductive factor in evolution.


Reptile-Fund, the fund so called, described at Hanover, Vol. V. p. 547, was abolished by Capri in 1898.

Reptiles, a very large class of Vertebrate animals, including Tortoises and Turtles, Lizards of many kinds, the divergent New Zealand 'lizard' Sphenodon, Snakes, and Crocodilians—five distinct orders with living representatives, but including also at least as many of wholly extinct types, such as Ichthyosaurs, Plesiosaurs, and Deinosauria.

Reptiles occupy a central position in the Vertebrate series: beneath them are Amphibians and Fishes, above them are Birds and Mammals. They begin the series of 'higher Vertebrates,' which at no period of life are the by-guards of life. Throughout their life are provided with two birth-roles or fetal membranes—a protective amnion and a respiratory allantois. Their relationships seem to be threefold, with the Amphibians, with Birds, and with Mammals. But there is no doubt that they are most closely linked to Birds—a fact first clearly recognised by Huxley, who emphasised the deep structural affinities of Birds and Reptiles by linking them together as Sauropsida, in contrast to Mammalia on the one hand and Ichthyopoda (Amphibians and Fishes) on the other.

Reference to the above article gives a contrast between Mammals, Birds, and Reptiles, we shall simply notice that Reptiles are cold-blooded, the temperature of the body not greatly exceeding that of the surrounding medium; that the heart is three-chambered, except in Crocodilians, where four chambers first occur; that mostly venous blood goes from the heart to the anterior viscera, and mixed blood to the posterior region, only the head and anterior regions receiving purely arterial blood; that the body is covered with scales, with which subjacent bony plates or septa are sometimes associated; the skull articulates by a single condyle with the backbone, and the lower jaw works against the quadrate bone; that the great majority are oviparous, while in some the eggs are hatched within the mother. The earliest remains of Reptiles are found in Permian strata, and the golden age of Reptiles was in Mesozoic, especially in Jurassic and Cretaceous, times.

Classification of Living Reptiles.—As the orders of Reptiles with living representatives are separately discussed, it will be enough here to give a general classification. Order 1, Chelonia: Tortoises and Turtles. 2, Rhynchocephalia: one form—the New Zealand lizard Sphenodon (q.v.), whose extinct ancestors date from the Permian. 3, Lizards: Lizards (q.v.), 4, Ophidia: Snakes (q.v.). 5, Crocodilia: Crocodiles (q.v.). Alligators (q.v.).

Extinct Reptiles.—The classification of the extinct Reptilian types is still very uncertain, but many authorities agree in recognising the following orders:

Anomodontia.—Reptiles with lizard-like body, limbs adapted for walking, biconcave vertebrae, and teeth fixed in sockets. The order is restricted to the New Zealand species and its nearest allies, and is thus almost confined within the Labyrinthodont Amphibians and with Mammals. Among the representative genera are Parapsaurus, Galesaurus, Deurosaurus, Dicyodon, and Placodus.

Sauropterygia.—Reptiles without exoskeleton, with long neck and short tail, limbs adapted for walking or for swimming, biconcave vertebrae, teeth fixed in sockets. All of them seem to have been carnivorous. The order is represented by the Trias to the Upper Cretaceous, and exhibits affinities with Amphibians. Among the representative genera are Plesiosaurus, Mosasaurus, and Nothosaurus.

Ichthopterygia.—Marine Reptiles, with whale-like body, without exoskeleton, with limbs modified as paddles, with biconcave vertebrae, with teeth implanted in a continuous groove. Many were carnivorous, others lived on fish and molluscs; there is some evidence that some were viviparous, the fossilised young being found in the fossilised mothers. The order is represented from the Upper Trias to the Upper Cretaceous, and exhibits affinities with Labyrinthodont Amphibians and with the New Zealand lizard Sphenodon. The largest Ichthyopterygians are Ichthyosaurus and Ophthalmosaurus. Some attained a length of 30 to 40 feet.

Rhynchocephalia.—As Sphenodon is the only
REPTON

surviving representative of the Rhynchocephalia, the order may be almost regarded as extinct. It is represented by Palaeotheria from the Permian, besides Champsosaurus, Hyperodapedon, Rhynchosaurus from later strata. Within or near this order may also be included a remarkable form Protosaurus from the Permian, a type for which habitation has exhibited the distinct order Protosaurus. The special interest of these forms is, according to Baur, that they 'are certainly the most generalised group of all reptiles and come nearest, in many respects, to that order of reptiles from which they are not derived.'

Dinosaurus.-The largest land Reptiles of crocodilian or more bird-like form, represented from the Trias to the Upper Chalk, exhibiting affinities with crocodiles and with birds. Representative genera are Iguanodon (sometimes measuring about 30 feet), Camptosaurus, Scelidosaurus, Stegosaurus, Ceratops (with long horns on the skull), Megalosaurus, Ceratosaurus (also horned), Brontosaurus (upwards of 50 feet in length), Atlantosaurus (with a femur 6 feet long).

Oviraptorousa.-Flying reptiles, often called Pteranodon, the scale of skin extended on the greatly elongated outermost finger. The order is represented from the Lias to the Upper Chalk by such genera as Pteranodon, Pterodactylus, Diaphorodon, and Rhamphorhynchus. Some had an expanse of wing of about 25 feet, but many were smaller. See Mivart, Monograph of the Pterodactyli (1874).


REPTON, a village of Derbyshire, 61 miles SSW. of Derby and 41 N.E. of Burton-upon-Trent. Here was founded the first Christian church in Mercia, of which Repton for a while was the royal and episcopal capital. It was the seat from before 690 till its destruction by the Danes in 874 of a celebrated monastery, as afterwards of an Austeri priory from 1172 till the Dissolution. Remains of this priory are incorporated in the buildings of the free grammar-school, which, founded in 1556 by Sir John Porte, has risen to be one of the great English public schools, with an endowment of £2000, eight scholarships and several entrance exhib- ited. Some 2200, and 2750. Among its former pupils have been Justice Denman, Bishop Piers Claughton, Professor Saniday, and J. E. Saniday, the public orator at Cambridge. The parish church has a graceful spire and a very interesting Saxon crypt, 17 feet square. Pop. of parish, 2000. See Biggins’s History of Repton (1854).

Republic, a party name in American politics, which has had at different times different significations. The first use of the name was in 1776; it was the alternative title of the Anti-federalists, who advocated the sovereignty of the states and the rights of the people, and finally secured those amendments and additions to the Constitution which were intended to secure state rights, and which declared that all powers not expressly granted to Congress by the Constitution are retained by the states or the people. Before the war of 1812, however, the term Democrats (q.v.) had been substituted as the title of the party; and the name of Republican was first used in 1856, when it was taken up by the new party which was organised to oppose the Democrats, its original holders. This party was formed to combat the extension of slavery; it appealed to all who were opposed to the repeal of the Missouri Compromise (see Missouri) and the efforts to make Kansas a slave state (see Kansas). It grew out of the Free-soil party (see Free-soilers), and at once took the place, as opponents of the Democrats, that the Whig party, which had died of overcompromise, had for some time feebly held. In 1856 it nominated Fremont for President of the free soil fight. The decision in the Dred Scott Case (q.v.) and the progress of events in Kansas greatly strengthened the party, and after the divisions among the Democrats over the same question in 1860 the success of the Republicans was assured. Elected Lincoln in that year, they held office
continuously from 1861 to 1885, the Republican presidents being Lincoln, Johnson, Grant (twice), Hayes, Garfield, and Arthur; and in 1888 they were again successful, electing Benjamin Harrison. The conduct of the civil war was in the hands of the Republican party, although, of course, northern Democrats formed a large proportion of the Union armies. For its history, see United States; and see the text. Republicans claim great credit for their management of the finances of the nation, which brought about the resumption of specific payment. The tariff was long the principal issue between Republicans and Democrats, the former being strong protectionists, the latter advocating tariff revision and the placing of some articles on the free list. This was the issue in the presidential campaigns of 1888 and 1892. In 1896 and 1900, however, the issue was complicated by Democratic demands for the free and unlimited coinage of silver, accompanied in 1896 by a protest against "Imperialism."


Republican Bird. See Weaver Bird. Repudiation, an unprincipled method for the extinguishment of a debt, by simply refusing to acknowledge the obligation, which has been adopted notoriously by several states of the American Union; Hayti has been the next worst offender. The eleventh amendment of the Constitution of the United States prohibits citizens of another or a foreign state from bringing suits against a state in the federal courts; while the individual states, not being independent sovereigns, could only be called to account by a foreign power through the national government. Reprisals or war are thus as impossible as a suit at law, and there is really no means by which the states can be compelled to recognize and meet their obligations. Twice in the history of the country have several states taken advantage of this condition of affairs—once after the commercial crisis of 1839, in which the United States Bank stopped payment, and again in the years following the civil war. In the latter period Virginia, North and South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Arkansas were among the defaulters. Virginia, indeed, refused payment chiefly on the ground that no part of its existing debt had been allocated to West Virginia when the latter was separated as a state in 1863; and later acts of repudiation have found a local justification in the same grievances. But in the other states repudiation is to be traced to the effects of the war and to the unsettled government which ensued. The rebellion had left commerce in these states prostrate and paralysed, and especially was it necessary that railways should be rebuilt and new roads constructed; and to this end the public credit was pledged, often recklessly and at ruinous rates. In most cases the debts created in aid of railways were repudiated on the ground that the money had been obtained collusively and with no proper form of benefit to the states: North Carolina thus wiped off an obligation of more than $12,000,000. The other states mostly based their action on decisions of their own courts or on the action of their own legislatures; but such decisions are to be regarded as ultra vires, and in their action they are not justified by law at all, but were simply taking advantage of the fact that they could not be compelled to pay.

Requeüa, a town of Spain, 37 miles W. of Valencia, cultivates silkworms, saffron, and fruits. Pop. 13,927.

Requests, Court of, an ancient court of equity in England, inferior to the Court of Chancery, and abolished 1841. Also, a local tribunal (known likewise by the name of Court of Consequence) instituted in London by Henry VIII, for the recovery of small debts. Similar local tribunals elsewhere have all been sanctioned by the county courts.

Requiem (Lat. requies, "rest"), a dirge or solemn service for the dead in the Roman Catholic Church. It consists in the celebration of the mass Pro Pauca et Eius Memoria ("For the Faithful Departed"), the first words of the Introit of which are Requiem aeterna.

Reredos (Fr.), the wall or screen at the back of an altar. It is usually in the form of a screen detached from the east wall, and is adorned with niches, statutes, &c., or with paintings or tapestry. In some cases it is attached to the east wall and is of great size, covering the whole of the wall, as at All Souls College, Oxford. That splendid 15th-century reredos had been plastered over at the Reformation, but was discovered and restored in 1872-76. In Durham Cathedral is a very fine example of a reredos in the form of a detached screen; it was brought by sea to Newcastle from London by Lord Neville in 1380, being perhaps of French workmanship, and was restored in 1846. The lofty reredos (c. 1480) at St Albans, dividing the presbytery from the retro-choir, is of the same type and age as that at Winchester.

Reredos, Salisbury Cathedral.
officially pronounced to them. *Rescripta principis* were one of the authoritative sources of the civil law, and consisted of the answers of the emperor to those who consulted him, either as public functionaries or as individuals on questions of law. They were often applied for by private persons, more especially women and soldiers, to solve their doubts or grant them privileges. The rescripts directed to corporate and municipal bodies were known as *Pragmatica sanctiones*, a name which is still applied to the public law of Europe (see *Pragmatic SANCTION*). Rescripts might gradually come to have the force of law, in so far as their determinations in particular cases were of general application.

**Rescue**, in English law, is the illegal delivery and discharge of a prisoner or of goods out of the custody of the law. If, for example, a tenant whose goods are distrained for rent take them by force from the bailiff, the dis-trainer has a right of action against the person who rescues the goods. A person who rescues a prisoner accused or convicted of treason, felony, or misdemeanor is himself liable to prosecution, &c. The punishment varies with the gravity of the charge. A person who rescues or attempts to rescue a murderer going to execution is liable to penal servitude for life.

**Resedaceae**, a natural order of plants, mostly herbsaceous, having alternate leaves and terminal spikes of hermaphrodite irregular flowers. There are some few species, mostly unknown in Europe and the west of Asia, and mostly mere weeds. Webb (q.v.) and Mignonneau (q.v.) are the species most worthy of notice.

**Reservation, Mental.** (Lat. *reservatio* or *restric-<tio mentalis*), the act of reserving or holding back some word or clause which is necessary to convey fully the meaning really intended by the speaker. It differs from equivocation (Lat. *equivocatio* or *ambiguitas*) in this, that in the latter the words employed, although doubtful, and perhaps not fitted naturally to convey the real meaning of the speaker, are yet, absolutely speaking, and without the addition of any further word or clause, susceptible of that meaning. Few questions in casuistry have excited more controversy, or have been the subject of fiercer recrimination, than that of the lawfulness of equivocation and mental reservation. In the celebrated Letters of Pascal (q.v.) against the Jesuits, this was one of the most prominent and, used as he employed it, the most effective topics; and Pascal's charges against the Jesuit casuistry of that day have been repeated in almost every popular controversy on the subject which has since arisen. There are several varieties of mental reservation, differing from each other, and all differing from equivocation. But as regards the morality of the subject all the forms of language calculated to deceive may be classed together. Mental reservation is of two kinds, purely mental and not purely mental. The former is meant a mental reservation which cannot be detected, whether in the words themselves, or in the circumstances in which they are spoken. Of this kind would be the mental reservation implied if a person, on being asked if he had seen A. B. (who had been questioned), said truly, and without searching, to reply: 'I have not seen him,' meaning 'riding on horseback.' A 'not purely mental' reservation is that which, although not naturally implied or contained in the words, may nevertheless be inferred or suspected, either from the words or the circumstances in which they are used. Of this kind would be the mental reservation of a servant, in giving the ordinary answer to a visitor's inquiry for his master: 'Not at home,' although his master were really in the house; or that of a confessor, who, in a country where the privileges of the secret of the confessional are known and admitted, on being asked whether a certain person had committed the confession to his conscience, and having confessed that he had committed, should answer: 'I do not know,' meaning 'outside of the confessional.' And, in general, all such doubtful forms, whether of mental reservation or of equivocation, may be divided into discoverable and undiscov-erable, in which the former is always found against the casuists for their teaching on this head has arisen from the confusion of their views as to these two classes of mental reservation.

According to the most approved Catholic authorities, 'purely mental' reservations and 'absolutely undiscoverable' equivocations are held to be in all cases unlawful, such forms of speech being in truth lies, inasmuch as they have but one real sense, which is not the sense intended by the person who uses them, and hence can only serve to deceive. This doctrine is held by all sound Catholic casuists, and the contradictory doctrine is expressly condemned by Pope Innocent XI. (Prop. 26, 27). On the contrary, mental reservations 'not purely mental' and 'discoverable' equivocations are held to be not inconsistent with truth, and in certain circumstances there is a compelling reason for resorting to them, allowable. An historical example of such equivocation or reservation is in the well-known answer of St. Athanasius to the question of the party who were in pursuit of him, and who, overtaking him, but not knowing his person, asked him why he was going. 'He is not far off,' replied Athanasius, and the party passed on in pursuit. And an ordinary example of discoverable mental reservation is that of a person who, on being asked by one to whom he could not with safety give a refusal, whether he has any money, should reply: 'No,' meaning 'none to lend to you.' In order, however, to justify the use of these devices of speech, casuists require that there shall be some grave and urgent reason on the speaker's part; as, for example, the necessity of keeping a state secret, or a secret of the confessional, or that of a professional character, or even the confidence entrusted by a friend, or the ordinary and fitting privacy which is required for the comfort and security of domestic life and of the peaceful intercourse of society; and that the equivocated sense of the form of speech employed, although it may be actually unsafe or want extra care and even unlikely to be discovered, may yet be, in all the circumstances, really discoverable. Some Protest-ant moralists admit that in some cases even equivo-cation is permissible; if any such reservations are allowed it is obvious there must be great difficulty in drawing a line between reservations that are permissible and those that are not. See CASUISTRY; Lugnoti's works; and Cardinal Newman's *Apologia*.

**Reservation of the Sacrament.** See *LORD'S SUPPER*, Vol. VI. p. 717.

**Reserved List,** in the Royal Navy, a device which formerly existed for expediting the promotion of officers who were still of an age for active service. Under certain Orders in Council of 1851 and 1853, officers who had been gazetted for promotion to the next grade on the Reserved List. This formed a bar to any further promotion; and removed the officer from active employment, except in the remote contingency of the Active List being exhausted, when these 'reserved' officers were liable to be called upon to serve. For all practical purposes, however, the Reserved List was a retired list. The officers placed on it obtained the half-pay of the rank to which they were
RESERVES

Reserves. In the organisation of the military resources of most European countries the reserve forces are, first, those soldiers who, having served some time in the regular army, are still liable to be called upon to serve it when raised from a peace to a war establishment on mobilisation; and secondly, those who are liable to be called upon to follow in second and third lines if the occasion requires. Thus, in Germany and Austria the regular army and its reserves have behind them the Landwehr and Landsturm. In France the Territorial Army and its reserves form the second line, and in Russia the militia takes a similar position. Liability to serve in one or other of these reserves lasts generally from about the age of twenty to forty-two.

In Great Britain there are two reserves—viz., the Naval Reserve and the Militia Reserve. The first consists of two classes, but the second class, some 900 pensioners of Chelsea and Greenwich hospitals, is gradually disappearing, and is not liable for service out of the United Kingdom. The first class (Army, 15,000; Royal Naval Reserve, 10,000) consists of men who served from three to eight years in the regular army, and are liable during the remainder of their twelve years' term of enlistment to be called back into the ranks in case of national danger or great emergency. They can be called out for twelve days' training in each year and in aid of the civil power, are paid £3 a year quarterly in arrear, and may re-engage for a further term of four years' service reserve at 4d. a day. They are called to the ranks by proclamation of Her Majesty in council, the occasion being formally communicated to parliament if sitting. The Militia Reserve consists of militiamen who, for an extra £1 annual bounty, take the liability to be called upon to serve in the regular army abroad or at home whenever the army reserve is called out on permanent service. Otherwise they do not serve in the regular army. One year in the Militia (v.x.), the yeomanry, and the volunteers form a second line of defence for the United Kingdom in case of invasion.

The native army of India has two reserves, active and garrison. The first is formed of men who have served not less than five or more than twelve years with the colours; the second of those who have completed twenty-one years' colour service.

A reserve, on the battlefield, is a body of troops held back by the commanding officer so as to be ready to meet a counter-attack, to support a success, or cover a retirement.

The Naval Reserve is the subject of a separate article.

Reservoir. See Water-supply.

Resil, a town of Persia, capital of the province of Gilan, stands near the south-west shore of the Caspian Sea, 150 miles NW. of Tehran. Silk is grown and manufactured; and rice and tobacco are cultivated. The port of the place is Eazeli, on the other side of the bay on which Resil stands, and 16 miles distant. Pop. upwards of 25,000.

Residence. See Domicle.

Resin. See Legacy.

Resins, a town of Italy, 4 miles SE. of Naples, at the foot of Vesuvius, and facing the sea. Pop. 13,626. Resina is built on the site of ancient Heracleanum, and was in part destroyed by the lava outburst of 1631.

Resins. A class of natural vegetable products composed of carbon, hydrogen, and oxygen. They are closely allied to the essential oils, all of which, when exposed to the air, absorb oxygen, and finally become converted into substances having the characters of resins; and in some cases these substances obtained by the action of plants on them yield them mixed with and dissolved in a corresponding essential oil. Like the natural oils, the natural resins are usually mixtures of two or more distinct resins, which admit of separation by their unequal solubility in different fluids.

The following are the general characters of this class of compounds. At ordinary temperatures they are solid, translucent, and for the most part coloured, although some are colourless and transparent. Some are devoid of odour, while others give off an aromatic fragrance from the admixture of an essential oil. In their crude state they never crystallise, but are amorphous and brittle, breaking with a conchoidal fracture; when pure several of them may, however, be obtained in the crystalline form. They are readily melted by the action of heat, and are inflammable, burning with a white smoke. They are usually described as non-volatile, but it has been shown that common resin may be distilled in a current of superheated steam. They are insoluble in water, but dissolve in alcohol, ether, and the essential and fixed oils. They are insulators or non-conductors of heat, and become negatively electric by friction. Many of them possess acid properties, in which case their alcoholic solutions reden litmus. These resins combine with the alkalies, and form frothy soap-like solutions in alkaline lyes. The resinous soaps thus formed differ from ordinary soap in not being precipitated by the chloride of sodium.

The resins are divisible into the hard resins, the soft resins, and the gum-resins. The hard resins are at ordinary temperatures solid and brittle; they are easily pulverised, and contain little or no essential oil. Under this head are included equal, the varieties of lac, mastic, and sandarac, and the resins of benzoil (commonly called gum-benzoil), jalap, guaiacum, &c. The soft resins admit of being moulded by the hand, and some of them are viscous and semi-fluid, in which case they are termed balsams. They consist of solutions of gums and resins in essential oils, or admixtures of the two. They become oxidised and hardened by exposure to the air into the first class of resins. Under this head are placed turpentine, storax, balsam of copaiba, and the balsams of Canopi, Peru, and Tolu. The gum-resins are the resinous juices of certain plants solidified by exposure to air. For these, see Gum.

The resins are very widely diffused throughout the vegetable kingdom. They are generally obtained by making incisions into the wood of the trees which produce them; sometimes, however, they are obtained spontaneously, and in other cases they require to be extracted from the wood by boiling alcohol. The crude resins are separated from the essential oils with which they are usually mixed by distillation with water, the resin remaining while the oil and water pass off; and from the gummy and mucilaginous matters by alcohol, which dissolves out the pure resins, which can be precipitated from their alcoholic solution by the addition of water. The resins are extensively employed in medicine and the arts.

Various fossil resins are known, of which the most common is Amber (q.v.). Some chemists place bitumen and asphalt amongst this class; and amongst the fossil resins described by mineralogists may be mentioned Fichtelite, Hartite, Iridite, Ozokerite, Scheerelite, Xyloretin, &c.

The common resin, or resin, of commerce excluding...
Respiration

in a semi-fluid state from several species of pine, especially Pinea tecta, P. malis, P. palustris, and P. ponderosa of North American Respiration, the pine, and P. Laricio of southern Europe, and P. sylvestris of northern Europe. The crude article, consisting of turpentnine and resin proper, is subjected to distillation, when the resin alone remains behind. The resin thus procured is used very extensively in the manufacture of thin paper and various other purposes, including the preparation of ointments and plasters in pharmacy.

The other resins most generally known and used in Europe, and here all treated in separate articles, are Anime, Copal, Durmast, Mastic, Frankincense, Lac, and Kauri Gum.

Res Judicata, in Law, means that the subject-matter of an action has been already decided by a court of competent jurisdiction. A matter so decided cannot again be made a ground of action, as between the same parties.

Resolution, in Music, the relieving of a discord by a following concord; see Harmony. For the Resolution of Forces, see Composition.


Respiration, or Breathing, is a part of the life of all organisms, animal and vegetable. It is a series of chemical changes, the first of which is the absorption of oxygen into the body, and the last of which is the excretion of carbonic acid. The breathing within the living organism consists of the intake of oxygen and the excretion of carbonic acid with the same organs, the lungs, due to the fact that both the food-stuff and the waste-stuff are gases, and not to any immediate connection between them. Necessarily any organ adapted to the diffusion of a gas from the air to the blood, must, as in the heart, be separated from the air or water from which and into which they have to pass by thin partitions—by the membranous wall of the breathing organ, and by the thin wall of the blood-vessels. Animals such as the frog, which have thin skins, can respire by them. In some the gases can diffuse through the whole surface of their bodies if the under skin is well supplied with blood-vessels. A frog for this reason can live for days without its lungs, but if its skin be rendered impervious to gases will die very quickly, even with the lungs intact. That air and water can be breathed is evident, if the whole system be divided into thin films, and the respiration must be reduced to a minimum, if indeed it exists at all.

In outer respiration we have two things to consider: (1) The manner in which fresh supplies of oxygen are pumped into the lungs, while the poisonous carbonic acid is pumped out. This may be called the mechanics of respiration. (2) The manner in which oxygen passes from the air in the lungs into the blood, and is held in the blood, and the manner in which the carbonic acid passes from the blood into the air-chambers of the lungs. This may be called the chemistry of respiration.

Structure of Respiratory Mechanism.—This mechanism consists of the lungs, a series of minute air-chambers with a network of capillaries in the walls, the air-passages from the air-chambers of the lungs to the outer air, and the chest-walls with their muscles, which act like bellows and change the air in the lungs. The essentials of the structure of a lung must possess have already been emphasised. The simplest lung that we can imagine would be an elastic membranous bag well supplied with blood-vessels, and with a pipe connecting it with the air; the most complicated that exist are essentially of that construction, the complications that occur having for their object merely the enlarging of the surface exposed to the air. There are first the nose and mouth; these join the upper part of the gullet, known as the pharynx (see illustration at Digestion). From the pharynx arises the windpipe (trachea); this passes through the voice-box (larynx) into the chest-cavity; there it divides into two passages (the bronchii); the bronchi go on dividing again and again, generally into two; the ultimate divisions (the bronchioles) open into clusters of air-chambers. The air-chambers are about 1/4th inch in diameter. It has been estimated that there are some 720 millions
of them, and that their total surface is about 2000 square feet. The walls of the air-chambers are formed of a thin membrane in which the blood and lymph capillaries ramify. Minute openings lead from the air-chambers into the lymph spaces of the membrane. The membranous walls are partly formed of elastic tissue. It is this that gives to the lungs their elasticity. The larger air-passage way (trachea and bronchi) are kept open by horseshoe-shaped plates of cartilage; muscles stretch between the poles of the horseshoe, complete the ring, and permit the size of the passages to vary, at the same time resisting over-distension when the internal pressure rises. These larger air-passage ways are lined by a mucous membrane, containing mucous glands; the innermost layer is a ciliated epithelium; the cartilage and the bony parts are those which give to the lungs their round shape.

and thus keep the passages free from mucus and remove foreign particles. As the passages become smaller they lose their cartilage, and the muscles form a continuous circular layer. The lungs are invested by a membrane (the visceral pleura). At the root of the lungs this membrane is continuous with a membrane which lines the chest-cavity (the parietal pleura). The space between the two is the pleural cavity; it is in reality a large lymph space, and communicates with the lymphatics of the pleura. Owing to the air-pressure within the lungs the two pleurae are closely pressed together, the lungs entirely filling the chest-cavity. If the chest-wall be punctured the lungs partially collapse owing to their elasticity, and the respiratory movements are unable to move the air in the lungs.

The chest is an air-tight chamber enclosing the lungs and the heart. The walls of the chest are formed of bones (the ribs, sternum, and backbone) and muscles; the bones and muscles are so arranged that the size of the chest-cavity can be altered. In this way the chest acts as a bellows and moves air in and out of the lungs. The ribs are sloped slightly downwards, especially after an expiration; when an inspiration is taken certain muscles fix the upper ribs, and those muscles connecting the ribs to each other contract and the ribs are raised, and thus the size of the chest-cavity is increased. At the same time a flat muscle called the Diaphragm (q.v.), which separates the chest cavity from the abdominal cavity, contracts, and after an inspiration is arched upwards (by the pressure of the abdominal viscera upon it, the viscera in turn being pressed upon by the abdominal walls), forcibly contracts, becomes flatter, and therefore enlarges the size of the chest-cavity, forcing the abdominal viscera downwards and causing the abdomen to protrude. (The relation of the lungs to the other main organs will be seen in the illustration at Abdomen; see also that at Diaphragm.) In these two ways, then, the size of the chest-cavity may be increased. The result of this enlargement is that the pressure of the air within the cavities of the lungs is lowered; air therefore from without rushes through the nostrils (one ought not to breathe through one's mouth) down the windpipe into the lungs and dilates them, by the introduction of oxygen. The movements which produce this result are known as the inspiratory movements. In making an expiration the reverse effects are produced; the chest-cavity is made smaller, the pressure of the air in the lungs increases, and some of the air is forced out into the air until the pressures inside and outside are equalised. Ordinary expiration is effected by the elasticity of the lungs, by the fall of the ribs, unsupported by the contraction of the muscles that caused an inspiratory movement, by the elasticity of the cartilages of the ribs which were twisted during inspiration, and by the elasticity of the abdominal wall which was forced outwards by those viscera pushed downwards by the diaphragm. An ordinary inspiration is therefore the result of a number of active muscular contractions, while an ordinary expiration is the result of the elasticity of some of the parts concerned. There are certain other respiratory movements to be considered. During inspiration and expiration the glottis (the opening between the vocal chords of the larynx; see the illustration at Larynx) undergoes a rhythmical widening and narrowing; this movement is greater and more sudden in quiet breathing. At the inspiration the nostrils dilate; in most cases perhaps the inspiration has to be rather a forced one before they do so. Forced expiration occurs when the supply of oxygen is insufficient, or when carbonic acid is built up in the blood. This is assisted by muscles that can aid in enlarging and decreasing the size of the chest-cavity is called into play. The average amount of air, in the case of an individual 5 feet 6 inches in height, that goes in and out of the lungs at each inspiration and expiration is about 20 cubic inches; this is called the tidal air. By means of forced inspiratory movements the inhalation may be increased by 120 cubic inches; by means of a forced expiration the outgoing tidal air may be increased by 90 cubic inches. After the most forced expiration possible there always remain within the air passages about 90 cubic inches of air. So that if we take as deep a breath as possible, and then make as forced an expiration as we can, we shall drive out 120 + 20 + 90 = 230 cubic inches of air. This is termed the respiratory capacity. Since the tidal air is only 20 cubic inches, and 180 cubic inches remain in the chest after an ordinary expiration, it follows the air directly changed during respiration is not that really within the lungs themselves, but is that within the nose, windpipe, and larger bronchi, the pipes that result from the branching of the windpipe. Therefore the changes of the air within the chest cavity are the result of diffusion between it and the purest air of the bronchi, aided by the rush with which the tidal air flows in.

The ordinary respiratory movements differ in the two sexes and at different periods of life. In young children the chest is altered in shape, and partly moved by the movements of the abdominal wall during inspiration is therefore very marked. In men also it is the diaphragm which is chiefly operative, but the ribs are also moved. In women it is the movement of the ribs, especially the lower ones, which is active. The respiratory rhythm is the relation of the acts of inspiration and expiration to each other as regards time. It may be expressed as follows: In. = 3, Ex. = 4, pause = 3. The number of respirations in a healthy person is about fourteen
or eighteen per minute; it is greater (nearly double) in childhood. It varies according to circumstances, exercise, rest, health, disease, &c.; in disease it may fall as low as seven or rise to a hundred.

The proportion of the respiratory movements to heart-beats is not one to one, or two to two; health they vary together. Since the heart and the lungs are contained in the same air-tight cavity, it follows that the variations in size of the heart as it beats must rhythmically affect the pressure of the air in the lungs, causing a succession of minute puffs of air to leave and enter the nostrils. Similarly the alterations in pressure within the chest-cavity affect the heart. Increase of pressure or expiration must (owing to the arrangement of the valves) help the blood to flow out of the heart. Decrease of pressure or inspiration must, for the same reason, help the flow of blood into the heart. The pressure which the respiratory muscles, aided by the elasticity of the parts concerned, can exert is on the average equal to that of 4 inches of mercury. The inspiratory muscles can lower the pressure within the chest-cavity by a much less extent. Further, although where the very air cavity below that of the atmosphere; the greater part of the energy of the inspiratory movements is used in overcoming the elasticity of the lungs, chest-walls, and abdominal walls. The respiratory sounds are two in number: (1) the tubular sound, heard over the chest; (2) the vesicular sound, heard over the whole chest during inspiration, probably caused by the sudden dilatation of the small air-chambers of the lungs, and to friction in the smaller passages. During expiration the vesicular sound is heard when present it is very soft and indistinct, probably due to the air passing out of the air-chambers.

The Nervous Mechanism of the Respiratory Movements.—Although all the muscles concerned in the movements of breathing are voluntary muscles—i.e., can be made to contract by an act of will—yet respiration is normally an entirely involuntary act. This is obvious from the fact that during sleep, or during absence of consciousness caused in any way, respiration goes on as well as during wakefulness. Further, although we are aware of very little, if any, breath or cease to breathe, yet we cannot by any effort of the will suspend the respiratory movements for longer than at most a few minutes at a time. We have seen how many are the muscular movements involved in breathing; and it is obvious that the add, therefore to the centre is necessarily the contraction of all these muscles must be a very nice one—in technical phrase, they must be co-ordinated. Such co-ordination must always be the result of a nervous mechanism, and this co-ordination, together with the fact of the rhythmical nature of the respiratory movements, suggests that the whole must be under the dominance of a nervous centre. The position of this centre has been ascertained by experiment; the whole of the upper part of the brain may be removed, and yet breathing will be unimpaired; but if a certain part of the medulla (see Brain and illustration, Vol. II. p. 388) be injured or removed then all respiratory movements cease at once; the centre must therefore be in that part of the medulla. The centre is bilateral, for destruction of one-half of the medulla will not affect the other. When the medulla is divided the respiratory muscles of that side only. Further, we must conclude that, since inspiration is in its muscular movements antagonistic to expiration, there is an inspiratory centre and an expiratory centre in each of the two halves of the respiratory centre; but, as already noted, the expiratory centre is much more in first forced respiration. The similar centres on each side are so co-ordinated that they act as one centre. This compound centre then is to be regarded as regulating the respiratory movements. We have said that if the medulla be injured the respiratory movements cease at once, and that from this it is concluded that the respiratory centre is in the medulla; but it seems that the movements may continue after destruction of the medulla, or may be produced by the reflex stimulation of some centre by irritating the skin. This subsidiary centre must be in the spinal cord; but it almost certainly is a subsidiary centre, though the matter is not quite settled yet.

Now is the centre 'automatic' in its discharges of nervous impulses, or is it reflexly stimulated into action by the arrival of stimuli from some other part of the body? We know by ordinary experience that the centre may be influenced from without, by impulses arising from higher parts of the brain, or when by will we alter the respiratory rhythm, or when it is affected by emotions, and also by impulses arising from the stimulation of sensory surfaces, as when cold water is dashed against the skin. It is found by experiment that the centre may be influenced in two ways: (1) by nervous impulses; (2) by changes in the blood.

Nervous impulses may affect either the inspiratory or the expiratory part of the centre. It seems that all afferent nerves—i.e. nerves in which the impulses travel towards and not away from the central nervous system—sense the activity of a respiratory centre (see Nervous System). But the vagi (nerves that are distributed to all the viscera) seem to be in specially close relation, beginning as they do close to the respiratory centre in the medulla, and ending in the lungs. If one vagus is cut there is no apparent disturbance; but if both are cut then the breathing becomes slower and deeper. If the end nearest of one of them be stimulated the respiratory rhythm is generally quickened; by a certain extent must obviously result in a standstill of all respiratory movements; the chest-walls remain in the inspiratory phase. But occasionally it happens that stimulation of the central end of a vagus, after both have been cut, produces a further slowing of the movements—they may indeed be entirely stopped; in this case the chest-walls remain in the expiratory phase. From these results it is concluded that the respiratory movements are made up of two kinds of fibres that affect the respiratory centre, one kind that increases the respiratory movements, another that inhibits them; and, further, that when one kind is active in causing increased inspiratory movements the other kind is active in causing depressed expiratory movements. Further, if air be drawn out of the lungs, thus imitating expiration, an inspiratory effort is made; if air be forced into the lungs, thus imitating an inspiratory movement, an expiratory effort is made. Therefore we may conclude that expiration stimulates the inspiratory centre, and that inspiration stimulates the expiratory centre. That the effects from which these conclusions are drawn are due to the stimulation of the vagus endings in the lungs is shown by the fact that they do not occur when the vagi have been divided; and that they are not due to alternation in the state of the essential gases of the blood is shown by the fact that they may be produced by forcing an indifferent gas, such as nitrogen, in and out of the lungs. The respiratory pump is therefore a self-regulating mechanism. If we cut the vagi the respiratory rhythm usually becomes slower, and the movements are deeper;
therefore normally stimuli are constantly passing up the vagi to the centre, and accelerating the discharge of impulses by the centre. Still, an accelerating effect is not the same thing as an initiating stimulus. Two simultaneous impulses on opposite sides of the higher parts of the brain are removed, impulses proceeding from above are not essential; and since when the spinal cord is cut below the medulla the movements of the nostrils and vocal chords continue (although of course all others cease), the centre works independently of sensory impulses arriving from any nerve, except the cranial nerves; and since these cranial nerves may be divided, if the medulla and spinal cord be left intact, without any effect upon the respiratory movements, we may conclude that the centre is automatic in its action, but may be influenced from without.

The more venous the blood the greater is the activity of the centre; when the blood reaches a certain state of impurity convulsions arise. We may conclude that the state of the blood affects the centre directly, and not reflexly, by stimulating the ends of different nerves in various parts of the body; because if the supply of blood be cut off from the medulla alone the same effects are produced. Venous blood differs from arterial blood in containing less oxygen and more carbonic acid.

The deficiency of oxygen is the cause of the greater activity of the centre of animals breathing an atmosphere containing nitrogen; the animal breathes an atmosphere containing sufficient oxygen but excess of carbonic acid, then the convulsions do not occur, but the animal may become unconscious, having been poisoned through some of the higher centres being poisoned.

When in action the centre discharges motor impulses down various nerves to all the muscles concerned in the respiratory movements. If any of the motor nerves be cut, the muscles supplied of course cease, since they are no longer stimulated by impulses proceeding from the centre.

The Chemistry of Respiration.—We have now to explain the passage of oxygen from the air-chambers of the lungs into the blood that circulates in the vessels of the chamber-walls, and the passage of carbonic acid from the blood into the air within the lungs.

In order to understand what follows we shall have to study the laws of diffusion (see also Diffusion). A gas consists of a great number of separate molecules in motion with great speed. The number of these molecules in a cubic inch at the temperature and pressure (1 atmosphere) is estimated about $10^{24}$ to $10^{25}$ molecules. Each molecule has a large path free from collision with other molecules. The average speed of a molecule varies with the temperature, increasing as the temperature rises. The molecules lying near the surface of any mass of gas will constantly impinge upon the boundaries; these impacts are so numerous and so close that they produce an apparently continuous pressure all over the boundary. This pressure obviously depends only upon the density (number of molecules in unit-space) and the temperature (average speed of the molecules) of the gas. Now, however, it may be supposed apart that when two or more gases are mixed their molecules interfere so little with each other that each gas exerts the same pressure upon the walls of the containing vessel as it would do were it alone present. In such a case the total pressure is the sum of the two or more partial pressures of the several gases. If the space in which a gas is enclosed be diminished the molecules are brought nearer to each other, until a point is reached at which many of the molecules apparently act upon each other in such a way as to become more complex molecules, thus forming a liquid in the lower part of the vessel and a gas above. These gases are in motion, and interchange, or diffusion, constantly takes place between the two regions. The number of molecules leaving the gaseous region depends only upon the state (temperature and density) of the gas. The number leaving the liquid depends upon the state (temperature and density) of the liquid. When the diffusion takes place in a closed space a state of equilibrium of interchange is soon reached. In the lungs the liquid molecules of the oxygen of the blood are being constantly moved past the common surface between the air and the blood; the inflow therefore of oxygen from the air into the blood is greater than the outflow from the blood to the air. On the other hand, the gaseous carbonic acid in the air is constantly removed from the common surface between it and the blood; therefore the outflow of carbonic acid from the blood into the air is greater than the inflow from the air into the blood. This picture of the state of matters that regulate the interchange of gases in respiration is simpler than the reality. The further complexity will be described immediately.

We must now consider the laws governing the diffusion when the gas above the liquid is not the gas of the liquid, as is the case when air rests upon a surface of water. Some of the molecules of the air will become entangled in the liquid, will form the liquid of the particular gases within the other liquid, and then the state of affairs will be as before, so far as the gases, and their liquids, of the air are concerned, and a state of equilibrium between each of these gases and its own liquid will be formed. But now suppose that the liquid and the gas have a special chemical affinity for one another, as is the case with the oxygen of the air and a substance in the blood, and as is the case with the carbonic acid of the blood and a substance in the blood. As soon as the gas has diffused into the liquid the chemical compound will be formed; but now the liquid and gas will be in a state of disequilibrium, and the reverse process (at ordinary conditions) will begin, the compound will occur, but slowly, because a greater violence of collision is necessary. Therefore, other things being equal, less pressure will be needed to maintain equilibrium, because fewer liquid molecules of the compound will become gaseous, and diffusion processes (at ordinary conditions) will occur. It is found that at a certain temperature and a certain pressure the dissociation scarcely takes place at all; but if temperature be raised, or if the pressure be lowered to a certain point, then the dissociation will be very rapid.

These laws of diffusion apply to the gases of the blood. In the investigation of these gases a sample of blood is placed under the receiver of an air-pump (thus imitating, though exaggerating, the normal pumping action of the chest-walls), the gases extracted are passed through various solutions which retain the several gases, and thus they may be estimated and examined. The quantity of oxygen obtained from arterial blood is greater than that obtained from venous blood. The arterial blood of a dog yields 23.2 vols. of ordinary pressure, or 175.83 vols. of mixed gases when the external pressure is reduced to zero. This mixture is composed of 23.2 vols. of oxygen, 34.3 vols. of carbonic acid, and 1.8 vols. of nitrogen.

If blood took up as much of these gases by mere diffusion as water does, it would contain 0.86 vols. of oxygen, 1.2 vols. of carbonic acid, and 1.6 vols. of nitrogen. Therefore it is evident that, while
the nitrogen is merely diffused into the blood, the oxygen and the carbonic acid must be combined with some substance or substances in the blood. If we gradually lower the external pressure of the atmosphere upon the blood we notice that at any given temperature (at which the combination can exist) the pressure may be lowered to a certain point without much gas coming off, but that at this point the gases begin to come off rapidly. This is another proof that the gases are combined and not merely absorbed in the blood; for in case of simple absorption the gases come off in equal amounts for equal volumes of air, whereas the amount of the gases that can be taken from blood-plasma (free from blood-cells) is 0·26 vols. of oxygen, 35·26 vols. of carbonic acid, and 2·24 vols. of nitrogen. The great mass of the oxygen is, therefore, not in the plasma, but in the corpuscles; while the great mass of the carbonic acid is in the plasma. The oxygen is found to be united to the red colouring matter, of which the red blood-cells are chiefly composed. This substance is called hemoglobin. It is not so easy to determine in what combination the carbonic acid exists in the plasma. A certain amount is in arterial blood until the partial pressure falls (although the above figures do not show it); indeed, some writers consider that the hemoglobin of these cells is the chief carrier of carbonic acid. The effect of lowered pressure upon blood-plasma, so far as regards carbonic acid, is much the same as it is upon solution in water. It is a general rule that the writers believe that the carbonic acid exists in the plasma in the form of sodium bicarbonate. Others believe that it may be in the form of bisodium hydrogen phosphate. The presence of red blood-corpuscles in a very marked effect upon the disengagement of carbonic acid under lowered pressure; it lasts for a considerably longer time. This effect appears to be due to the presence of oxyhaemoglobin.

The total pressure of the atmosphere is 760 mm. of mercury. The partial pressure of oxygen in the air is 139·6; of carbonic acid, practically zero; of nitrogen, 600·4. Oxygen does not leave arterial blood until the partial pressure falls to 29·64, nor venous blood until the partial pressure falls to 22·04; these are therefore the partial pressures of oxygen in arterial and venous blood. Carbonic acid does not leave the plasma until the partial pressure falls to 21·18, and venous blood until it falls to 41·04. Therefore blood exposed to air would readily gain oxygen and lose carbonic acid. But the air in the part of the lungs where the respiratory interchange takes place is not the same as the air surrounding the body; the partial pressures of expired air will be nearer the true numbers; they are—of oxygen, 121·6; of carbonic acid, 33·4; of nitrogen, 600. But even expired air is not the same as air within the alveoli; for the air taken in and out of the lungs (tidal air) only enters and leaves the larger respiratory passages near the opening into the outer air; from these it diffuses into the air of the alveoli. The partial pressures of this air have been estimated by introducing a collector into the alveoli and taking out samples. Specimens of air collected in this way have been found to have the following partial pressures:

<table>
<thead>
<tr>
<th>Oxygen</th>
<th>Carbonic Acid</th>
</tr>
</thead>
<tbody>
<tr>
<td>29·64</td>
<td>41·04</td>
</tr>
</tbody>
</table>

The vertical line represents the alveolar and capillary wall; the arrows show the direction in which the gas molecules must diffuse. But if we compare the partial pressures in venous blood, in arterial blood, and in alveolar air, a very remarkable fact appears.

<table>
<thead>
<tr>
<th>Alveolar Air</th>
<th>Venous Blood</th>
<th>Arterial Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxygen 27·44</td>
<td>22·04</td>
<td>24·04</td>
</tr>
<tr>
<td>Carbonic Acid 41·04</td>
<td>21·04</td>
<td></td>
</tr>
</tbody>
</table>

The venous blood flows through the lungs, and the carbonic acid of oxygen in arterial blood is higher than it is in alveolar air, the place from which it must have come; while the pressure of carbonic acid in arterial blood is lower than it is in alveolar air, the place to which it has passed. We must therefore conclude that the living alveolar wall has exercised some influence upon the gases in virtue of its secreting and excreting activity; it has done work against the molecular energies that produce diffusion. But the numbers given by various authors for the partial pressures of the gases in the various cases are not always in perfect agreement, and no certain conclusion can be drawn from them. Still in any case the slight differences of partial pressure, especially of oxygen, render the validity of any explanation of the rapidity of gaseous interchange between the lungs in terms of ordinary diffusion entirely extremely doubtful. We can write that, while the exchange has recently been suggested in the sudden stroke of the heart, which would have an accelerating effect upon the liberation of gasses from a fluid under low partial pressure; just as a tap upon the sides of a glass containing soda-water will cause bubbles of carbonic acid to be formed off. Further, as already stated, some carbonic acid is combined with hemoglobin. This combination is, like oxyhaemoglobin, dependent upon the partial pressure of the carbonic acid, and is easily given off when that pressure is lowered. Possibly the hemoglobin may be an important carbonic acid carrier in the blood.

Effects on Respiration of the Quality and Quantity of the Gases of the Atmosphere.—The respiratory mechanism, as well as the whole body, is adapted to work with air of a certain composition and at a certain pressure. The mechanism can adapt itself, within certain limits, to variations of composition and pressure. We have to state what these limits are, and what happens when they are overstepped. We shall study first of all, because of its practical importance, the results of breathing in a confined space, or in one insufficiently ventilated. The effect upon the air of course is that the proportion of oxygen is lowered, and that of carbonic acid increased. The first effect upon a person experiencing such a state of affairs is that a sense of mental and muscular fatigue occurs when the proportion of carbonic acid rises to 0·1 per cent., the normal proportion being 0·04 per cent.; and this is not due to the carbonic acid, but to the presence of organic matter, derived probably from the clothes, of the amount of which the carbonic acid happens to be a measure; for if pure carbonic acid be introduced into the air of a room, until the proportion rises to 1 per cent., no disagreeable sensations are experienced in breathing it. If the proportion of oxygen be still further diminished, or by shutting the trachea of an animal all supply of oxygen to its blood be cut off, the oxygen of the blood begins to be used up, and carbonic acid begins to accumulate, and asphyxia sets in. There are three stages of asphyxia. (1) The breathing becomes deeper and more rapid, the blood-pressure rising at the same time. (2) The respiratory movements continue to increase in force and
RAPIDITY, extra muscles are called into play, the
respiratory movements are especially marked; then
all the muscles that can possibly aid in expiration
are used, the excitement spreads to nearly all the
muscles of the body, and convulsions ensue; these
violent efforts exhaust the body. (3) A stage of
quiet, due to exhaustion, occurs; a few long-drawn
inspiratory gasps are made, these die out; the
whole body is convulsively stretched out, and
death intervenes. When the trachea of a dog is
artificially closed these events run their course in
from four to five minutes; the convulsions appear
at the end of the first minute, and cease suddenly
within the second minute. In drowning death is
often hastened by the entrance of water into the
lungs. The time at which death from drowning
occurs varies with the state of the animal at the
time of the occurrence. Young animals—e.g. a
puppy—in which the respiratory changes are less
active than in adults, may survive an immersion
of fifty minutes; but a full-grown dog rarely
receives after having been 15 minutes under water.
For man, see below, p. 467. By training, as in the
case of divers, the respiratory centre may be
acclimated to the scarcity of oxygen for much
longer than it can normally.

We next consider the effects of changes in the
partial pressures of the gases of the atmosphere,
the blood, and surrounding media, on the
function of the respiratory apparatus. Reduced
partial pressure of oxygen, as already noted, results in asphyxia. Increased
partial pressure of oxygen results in the pheno-
menon known as apnoea. After several very deep
inspirations the state known as apnoea occurs, and it is easy to hold the breath for a longer time than
usual. The usual explanation of this has been
that the oxygenation of the blood is so complete
that there is enough to last some time, and the
centre is not stimulated by its absence or by the
presence of the reducing stuff in the blood. Later
authorities regard the cessation of respiratory
movements which occur when oxygen is rapidly forced
into the lungs by rapidly succeeding respiratory
movements as due to fatigue of the respiratory
apparatus. Increased partial pressure of carbonic
acid tends to the accumulation of carbonic acid in the
blood, and hence to the production of narcosis
without convulsions. Decreased partial pressure of
carbonic acid results merely in the carbonic acid of the
blood being able to leave the blood with greater
readiness. Alterations in the partial pressure of
nitrogen have no effect. Exposure to dessication
of the atmosphere or to concentrated carbonic
acid or oxygen are not affected.

Another point to attend to is the effect of variations
in external pressure, the proportional com-
position of the atmosphere remaining unchanged.
Reduced pressure will cause fatal convulsions, due to the sudden liberation of large quantities of the
inert gases in the blood and the air, these plug up the smaller vessels, and affect the
working of the valves of the heart, and cause
asphyxia. If the pressure be gradually diminished,
as in ascending a mountain, no effect even at con-
siderable heights is experienced beyond a feeling
of discomfort at breathing at the higher atmos-
phere. This is due to a derangement of the vascular
system, the walls being constructed to meet a
certain external pressure. If only the respiratory
interchange of gases were concerned, the total
external pressure might be reduced from 760 mm.
to 300 mm., corresponding to a partial pressure of
oxygen of 28 man. at altitude of 17,000
feet, before the combination of oxygen with
hemoglobin, at the temperature of the blood,
would be seriously affected. In various parts
of the world there are people living at an altitude
of 11,000 feet. If the pressure be still further reduced,
by the production of carbonic acid as that which results from absence of oxygen; the characteristic convulsions are often absent, while a rapid onset of feebleness amount-
ing almost to paralysis occurs. Increase of pressure
up to a pressure of several atmospheres is followed
only by symptoms of drowsiness, due probably to
increased pressure upon the whole organism rather
than to a direct derangement of respiration. At
a pressure of fifteen atmospheres, which corresponds
to a partial pressure of oxygen of three atmos-
pheres, the animal dies of asphyxia with convul-
sions as though from deficiencies of oxidative
power.
The production of carbonic acid is diminished with
increase of pressure—i.e. the oxidations of the
whole body are lessened. At a certain point these
oxidations cease, and the animal dies. All living
things are killed by a too great pressure of oxygen.
For the oxidations of some substances—e.g. phosphorus—are analogous; at a certain pressure
they will not burn.

The effect of variations in temperature must not be
overlooked. By variations in temperature we mean of course variations in the temperature of
the body and of the blood, and not the variations
in the temperature of the surrounding medium,
for these have normally, in warm-blooded animals
(the temperature of cold-blooded animals
varies with that of the surrounding medium),
no effect upon the temperature of the body, owing
to the regulating mechanism afforded by the
vessels of the skin and vaso-motor system (see
Circulation). The temperature of an Eskimo
is nearly the same as that of an African; and in a
Turkish bath the temperature only rises a very
little. In warm-blooded animals the chemical
processes of the body decrease with a
lowered temperature, and increase with increase of temperature; but the case is
with warm-blooded animals, for the temperature of the body in an atmosphere of low temperature is partly
kept up by increased oxidation i.e., by
the production of carbonic acid. If the temperature of the blood is actually raised
the chemical activity of the body of a
warm-blooded animal rises. Such an animal dies
when the temperature of its blood rises to 45° C.,
or 50° C., a nummul at 45° C., and a bird at 50° C.
Death is due to the fact that when the tempera-
ture rises to this point the partial pressure of
the oxygen of the air is no longer sufficient to main-
tain the combination of oxygen with hemoglobin.
Theoretically a higher temperature might be
survived if the external partial pressure of oxygen
were purposely increased.

INNER OR TISSUE RESPIRATION.—We now come to the last and most interesting part of our subject
—the manner in which the oxygen of the blood
enters the tissues, the use made of this oxygen by
the cells of the tissues finally resulting in the for-
mation and excretion of carbonic acid. As we have
seen, this carbonic acid leaves the tissues and enters the
blood. The term 'inner respiration' is by some
writers restricted to the interchange of the gases
between the tissues and the blood; but it is
usual and more convenient to include in that term
what is now being said at the higher modes of the
cells. We have spoken with confidence
of this respiratory action of all the cells of the

body, but we must not forget that it has not always been believed in, and even now is doubted by some. The original theory was that the oxygen was used, and the carbonic acid formed, in the lungs only. This was disproved when it was shown that there is more oxygen and less carbonic acid in the blood of a breathing man than in that of a sleeping man; it is the difference that going to them. Next it was, and still is by some, thought that the oxidations take place within the blood; the cells of the tissues were imagined as pouring oxidisable matters into the blood. Usually very little matter capable of taking oxygen is found in the blood, but in that of asphyxiated animals more of such matter was found; this was explained by supposing that in asphyxian the oxidisable excreta from the cells accumulated in the blood through insufficiency of oxygen; but it has recently been shown that this relieving stuff only exists in the red blood-cells—i.e. in the reduced haemoglobin—while lymph, which we might expect to find rich in such matters, is being eaten by them. Lastly, the supposition that the cells of the tissue take oxygen directly is so much in harmony with all our present ideas of animal physiology and with the facts of comparative respiration (one-celled animals breathe, and plants breathe, and in these there is no circuit of breath) that every one is likely to remain so for some time. All the food of a meal, or its equivalent, is in about six hours oxidised into carbonic acid, water, and urea. This is obvious without any elaborate calculations from the fact that we may observe that every one is likely to remain so for some time, while, apart from the indigestible parts of the food, which do not affect the problem, the chief matters that leave the body are those mentioned above. Yet food-stuffs outside the body are not affected by oxygen at the temperature of the body. Various suggestions as to the possible respiration of blood liberally have been made; but, since the phenomenon is obviously dependent upon the vital processes of cells, suggestions in terms of the principles of ordinary chemistry cannot carry us far.

Further information regarding respiration will be found in the various editions of the text-books of physiology recommended at the end of this article upon that subject. The diseases of the respiratory organs are dealt with in separate articles, BRONCHITIS, CONSUMPTION, PLEURISY, PNEUMONIA, TUBERCULOSIS.

Historically, William Harvey (384 B.C.) thought that the object of respiration was to cool the body. He observed that the warmer the animal the more rapid the breathing, and transposed cause and effect. Galen (131-203 A.D.) experimental on the mechanics of respiration and the functioning of the nervous mechanism. He believed that 'soot' and water were excreted from the body by the lungs. Malphighi (1661) described the structure of the lungs. Van Helmont (1664) discovered carbonic acid; Black (1757) observed that carbonic acid is breathed out of the body. Priestley (1774) discovered oxygen. Lavozier (1775) discovered nitrogen, found the composition of the air, and taught that the formation of carbonic acid and water resulted from the combustion that took place in the lungs. Vogel proved the existence of carbonic acid in the exhalation of the lungs and inhaled the former in arterial blood. Magnes extracted and analysed the gases of the blood in both states.

Comparative.—Most of the Protocora, all the sponges and stinging animals, and many simple worm-types live in water, which washes their surface and saturates their substance, the oxygen dissolved in the water serving the same purpose as that mixed with the air. While many worms breathe simply through their skin, many of the aquatic forms have structures specialised for respiration—mucous membranes, or nodules or muscular outgrowths of the body-wall. In Echinoderms respiration is effected by the tube-feet, and
sometimes by hollow "skin-gills" as well. The crustaceans usually breathe by gills or through the skin; in Peripatus, Myriopods, and insects air-tubes or tracheæ ramify throughout the body. Scorpions have plated sacs or "lung-books," which many regard as modifications of tracheæ; and these are sometimes placed in spiders also, without the addition of ordinary air-tubes. The king-crab has a unique arrangement, consisting of plated sacs or "gill-books," adapted for breathing in water. Some mollusce breathe simply by the skin, others have external gills, most have gills inside the mantle, appendages like snails have a mantle-cavity which serves as a lung. In Balanoglossus there are numerous respiratory clefts opening from the pharynx to the exterior; Appendicularia and young Tunicates have a pair of these; in adult Tunicates the primitive clefts are replaced by numerous secondary slits on the wall of the pharynx, through which water drawn in by the mouth passes into an atrial or peribranchial chamber and thence to the exterior; the same is true of Amphioxus. Clefts from the wall of the pharynx to the exterior are, indeed, characteristic of vertebrates, but beyond the amphibia they are transitory embryonic structures, never used for breathing. This loss of functional gill-clefts is associated partly with the development of an embryonic birth-robe known as the allantois, which secures the aeration of the embryo's blood, and partly with the transition from aquatic to terrestrial life. In the lungfish the nasal sac opens into the mouth; in fishes this is only true of the double-breathing Dipnoi; in all other vertebrates air passes through the nostrils in and out of the mouth and lungs. In the bag and lungfish there are paired gill-pockets, and the respiratory arrangements are otherwise peculiar. In fishes gill-filaments are borne on the skeletal arches separating the gill-clefts, and the blood-vessels spread out on the filaments are washed by currents of water. Young Elasmobranchs have at first external gills and afterwards the internal gills characteristic of all fishes. The Dipnoi have gills, but they also come to the surface and gulp air, using their air-bladder as a lung, and thus pointing the way to amphibians. For, while almost all amphibians have gills in their youth, all the adult air-breathers have lungs, though some retain their gills as well. Among higher vertebrates there are many peculiarities, such as the single lung of most serpents, the balloon-like air-sacs around the lungs of birds, and the adaptations of cetaceans as aquatic lung-breathers, but the essential characteristics of pulmonary respiration are the same in all. The hemoglobin, so important in respiration, occurs first in Nemer- teans, and is present in some other worms, some Echinodermata, a few Arthropods, some mollusces, all vertebrates except the Tunicates, Amphioxus, and a few exceptional fishes. But though hemoglobin is not present in most invertebrates, analogous pigments are common, especially hemocyanin, which turns bluish when oxidised.

Artificial Respiration.—When death is imminent owing to a cessation of the natural respiration movements, it may sometimes be averted by an imitation of them carried out for some time. Such a condition may occur in disease (e.g. epilepsy), though very rarely; it is most common in suffocation, either by drowning, choking, or strangulation, and is sometimes met with also in poisoning by noxious vapours (e.g. carbonic acid, carbonic oxide, coal-gas, chloroform, &c.).

In order that any method may have a chance of being successful it is of course necessary that the entrance of air into the lungs be not impeded, either by a piece of food or by water in the wind-pipe, or by the tongue falling back and closing the upper opening. A piece of food may sometimes be removed through the mouth by the finger; if this fails the wind-pipe should be opened (see Tracheotomy). In these apparently drowned the body should first be laid on the face, with the head low, and the thorax and abdomen pressed upon in order to expel fluids which may have been drawn into the tracheæ and bronchial tubes. The tongue may need to be held forward; this may be done by an assistant, or an elastic band passed round the tongue and the chin will effect the object.

Numerous different methods have been devised for effecting the objects aimed at, and no general consensus of opinion has yet been arrived at as to which is the best. The methods fall into three divisions: (1) insufflation, or blowing of air into the lungs, either by the mouth or by means of bellows; (2) manual methods, in which external manipulations of the chest-walls are made to effect the entrance and exit of air; (3) electrical stimulation of the respiratory muscles. In all cases where artificial respiration is required every moment is of importance. It is doubtful whether life can ever be restored when the heart has ceased to beat for more than a few seconds; and when breathing has stopped failure of the heart's action is always imminent. That method is therefore best which can be applied with the least possible loss of time, so that under ordinary circumstances the methods which require bellows or electric batteries are out of the question. Direct insufflation, or blowing of air into the patient's lungs by the mouth applied to his mouth, is now hardly ever used except in the case of very young children. Of the manual methods those most in use are Marshall Hall's (1856), Silvester's (1857), and Howard's (1877). The second is certainly the most easy to learn, but is more fatiguing to carry out for a length of time than either of the others. In Marshall Hall's method the body is laid upon its face and rolled 'in what may be termed erable fashion' from this position on to one side and a little beyond it (inspiration), and then back on to the face (expiration). In Silvester's method the
patient is laid on his back on a plane, inclined a little from the feet upwards, and the shoulders are gently raised by a firm cushion placed under them, which also throws the head back. The operator then grasps the patient's arms just above the elbows, and raises them till they nearly meet above the head. This action imitates inspiration. The patient's arms are then turned down, and the chest-wall, or, as it is termed, the within half of the chest. A deep expiration is thus imitated. In Howard's method the patient is laid on his back with a cushion below the middle. The operator kneads astride his hips, places his hands with fingers spread outwards over the chest-wall, and alternately bends forward, throwing his weight on the chest to imitate expiration, and springs back to allow the elastic recoil of the chest-wall to imitate inspiration.

Whatever method be adopted, the movements must be gently, regularly, and perseveringly carried on, at the rate of from ten to fifteen times in the minute; and when the faintest natural effort at respiration is observed they must at once be tim ed so as to reinforce and not to oppose it. In some cases life has been restored under artificial respiration when all that has been done before has failed. In all cases, but especially in that of persons apparently drowned, artificial respiration should be conducted in a warm atmosphere, 90° F., or even more if possible, and should be supplemented by warmth applied to the extremities. In many species of animals artificial respiration can be continued for an hour or even several hours. If stunning or fainting has occurred at the moment of immersion, so that the respiratory movements have been annulled or much diminished for the time, less water is required, and the chance of recovery may be greater. In other modes of death by suffocation, such as choking or strangulation, the action of the heart may continue longer, and restoration to life be therefore possible after a longer deprivation of air.

See the publications of the Royal Humane Society and Royal National Lifeboat Institution; various handbooks on ambulance work. A résumé and discussion of the various methods is given by Dr. B. W. Richardson in the American Journal of the Medical Sciences, for 1857.

**Respirators** are worn over the mouth (oral) or mouth and nose (ori-nasal) for changing the properties of the air inspired. The name was first given by Mr. Jeffreys to an apparatus he contrived about 1835 for the purpose of warming the air, formed of numerous layers of fine perforated metal with wire soldered to them. Their value in diminishing the risk of catching cold, which in many cases is undoubted, probably depends at least in part on their affording protection to a sensitive portion of the skin; they act, in fact, as an additional article of clothing. But they are of most value to those who are not able to breathe through the nose in the natural way. Respirators have been largely used of late years in diseases of the nose, throat, lungs, &c. for improving the inspired air with medicated vapours; for this purpose construction of a small chamber containing a sponge or cotton-wool which is kept charged with the substance whose action is desired (carbolic acid, cresote, eucalyptus, or pine oil, &c.). Respirators have been also devised for freeing the inspired air of impurities—e.g. in the case of firearms they have come into an atmosphere strongly charged with smoke; of needle-grinders and others whose work gives rise to much irritating dust; of those who are exposed to foul gases, &c. See Filter.

**Respite,** a temporary delay of the execution of a criminal. See REPRIEVE.

**Responsor** is a loan raised by the master of a ship, when he has no other means of doing so, upon security of the cargo or goods on board the ship. The contract has reference to a particular voyage, and the conditions are that if the subject on which the money is advanced be lost by sea, risk, or superior force of the enemy the lender shall lose his money; and that if the goods arrive in safety the lender must be paid the value of the goods, plus the rate of interest, called marine interest. When the ship herself is hypothecated the contract is called Bottomy (q.v.). As a matter of fact the term responsor is now seldom used, and generally the expression bottomy is employed whether the vessel or her cargo is put to loss by the enemy.

**Responsibility.** See INSANITY, INFANT, HUSBAND AND WIFE, EVIDENCE, CAPACITY (LEGAL), LIABILITY.

**Responsions.** See OXFORD, Vol. VII. p. 682.

**Rest-harrow** (Ononis), a genus of plants of the natural order Leguminosæ, sub-order Papilionaceae, having a 5-cleft bell-shaped calyx, the standard of the corolla large and striated, the keel beaked, the pod turgid and few-seeded. There are many species of Rest-harrow, of which some are gener ally herbaceous or half-shrubby. The Common Rest-harrow (O. arvensis) is abundant in pastures and by waysides in Britain. Its lower leaves have three leaflets, the upper are simple; the flowers are axillary and rose-coloured, or occasionally white. The plant is half-shrubby, with somewhat spiny stems; viscid; and its smell strong and unpleasant. The roots are tough and woody, whence its English name. It is sometimes a troublesome weed, but only in neglected pastures, and disappears after careful cultivation.

**Restiaceae,** a natural order of plants, nearly allied to Cyperaceae, but the Cyperaceous tribes are of the southern hemisphere, and abounding at the Cape of Good Hope and in Australia. They are herbaceous plants, or sometimes half-shrubby, with simple stems and narrow leaves, and are hard, wiry, and rush-like. They have generally a creeping root-stock.

**Restigouche,** a river of Canada, rises in eastern Quebec, flows south-east into New Brunswick, then east and north-east into the Bay of Chaleurs, forming part of the boundary between the two provinces. Its length is about 200 miles.

**Restoration,** the resumption of monarchical government on the return of Charles II. to his kingdom, May 29, 1660. A form of prayer for that day was annexed to the Common Prayer-book from then until 1859; and, in commemoration of Bossucl (q.v.), 'Oak-apple Day' was long also celebrated by the displaying and wearing of branches and sprigs of oak, with gilded oak-apples.

**Restoration,** in its true sense, means bringing back or replacing what has gone; but of late years the word has been given a new meaning. Restoration now means making new imitative work to take the place of decayed or fractured work, and in this sense it applies to pictures, sculpture, furniture, and architecture; but as applied to architecture it is allowed a still wider meaning—viz. the building up anew and with new materials portions of buildings which have ceased to exist, such new work being designed afresh in imitation of what was supposed once to have existed. The new meaning of the word restoration only applies to works of art, including all the decorative arts. The 'restoration' of pictures and sculptures has long ago been condemned as diminishing the value of such works of art. For instance, at the British Museum and other public galleries it used to be the custom to employ a sculptor to
Sir Gilbert Scott was the most noted. Into his hands was placed nearly every cathedral church in England, as well as a countless number of parish churches, and the finishing touches of the great works of the elder Pugin. Long before his death a cry of discontent arose. Even those who had felt that it might be possible to imitate the medieval work accurately, so as to replace missing features, saw that this was a hopeless task, for not a single successful example of 'restoration' had been pointed to.

Ruskin wrote strongly against 'restoration,' urging the folly of attempting to reproduce a lost work of art or any portion of it, and giving it as his opinion that the only right method of treating our ancient buildings—such indeed as had not been destroyed by the building of new structures or of removing old features, by propping leaning walls and mending leaky roofs. His words did but sound the note which was in the minds of many, and in 1877 a society was formed in London calling itself the Society for the Protection of Ancient Buildings, and of the architects, artists, and many professions, including the clergy. This society has done its best to point out to those who still believe in the possibility of 'restoration' the destructive character of such work—destructive both of works of art and historical evidences—and it has urged the importance of keeping our ancient buildings in thorough and constant repair so as to avoid the necessity of wholesale renewal or rebuilding. The society also urges that no purely ornamental feature should ever be renewed any more than the antique statue should have its missing features replaced, and that where new features have of necessity to be introduced every effort should be made to keep them harmonious with, but dissimilar from, the ancient work. As examples of 'restoration' works we may give the north transept of Westminster Abbey and the west side of Westminster Hall, nearly the whole of St. Alban's Abbey, the west front of Salisbury Cathedral (where an attempt has even been made to produce medieval sculpture), Chester Cathedral, Worcester Cathedral; and, in fact, not a cathedral remains in England that does not bear marks of the movement. As has been shown, the restoration of ancient buildings has been, in some cases, so thorough that it has met a check, and shows signs of dying out; although it has spread to Scotland, the Continent, and even to India. Fortunately government has put a check upon it there, and we may hope that restoration as understood by the school of Sir Gilbert Scott will henceforward be practically abolished.

Restoration of Pictures. The restoration and the cleaning of pictures may be considered together: though cleaning, of course, more strictly applies to the removal from their surface of the accretions of dust or discoloured varnish which obscure their beauty, while restoration refers to the replacement of actual flaws in their surfaces. Thus, paint, or in the canvas or wood upon which the paint is laid. When a musty varnish has been used by the painter, and has become discoloured and opaque, it may be removed by careful and gentle friction with the points of the fingers, previously covered with a resins powder, which frays off particles of the hardened coating in the form of a fine white dust. When copal varnish has been applied, its removal is more difficult and dangerous, and is usually effected by an application of weak alcohol, spirits of turpentine, and oil. A paste made from wool is applied, and the varnish dissolved in it, and passed over the surface of the varnish, which it dissolves and removes; a similar pad steeped in pure oil being applied at intervals to stop the action of the spirit when it threatens to disturb the colour beneath the varnish. When portions of the paint or of the ground of priming upon which it has been laid have been removed,
Resurrectionists

Restorationists and priming but surface on the 1866 line of the special well-known Phila. 39, the the have Daniel varying reflect having the general back, the 15). it had relined the 16). have Cor. Rev. the time restoration therefore usually; will Westcott's the The also canvas on so examining, its the they practice ironed, and the ironed, a process which has the effect of restoring evenness to a cracked surface of paint; though if the artist has worked with a thick impasto the raised points of colour are apt to become flattened, and afterwards ironed, which has the effect of restoring the paint to its original state. When a fresco has been removed from a wall this is usually effected by pasting its surface on paper, and then with a chisel slowly detaching the mortar which bears the colour from the stones upon which it has been laid, each portion, as it is gradually withdrawn from the building, being called on a large cylinder. All the operations to which we have referred require extreme caution and great practice for their successful accomplishment. When they are entrusted to careless and untrained hands damage is certain, and it is impossible to estimate the amount of injury to works of art that has been effected by ignorant picture-restorers.

Proper care of a picture, however, and preservation from damp and dust, will obviate the necessity for its being subjected to restoration; and such precautions are the best of all, and the best of all to prevent the closing in its back, and by covering its surface with glass, which answers all, and more than all, the preservative purpose of varnish, with the additional advantage that it does not chill and discolour with time. Glass is being largely adopted in the great public galleries, for covering existing pictures, and it has only one disadvantage—its tendency to reflect the objects placed opposite it, and so to interfere with the ready and complete examination, as a connected whole, of the entire surface of a large, and especially of a dark, painting.

Restorationists, a general name for those who hold the belief in a general apocatastasis, or restoration of all things, in which, after a purgation by pasto or glue, to a new canvas, and afterwards ironing, a process which has the effect of restoring evenness to a cracked surface of paint; though if the artist has worked with a thick impasto the raised points of colour are apt to become flattened, and afterwards ironed, which has the effect of restoring the paint to its original state. When a fresco has been removed from a wall this is usually effected by pasting its surface on paper, and then with a chisel slowly detaching the mortar which bears the colour from the stones upon which it has been laid, each portion, as it is gradually withdrawn from the building, being called on a large cylinder. All the operations to which we have referred require extreme caution and great practice for their successful accomplishment. When they are entrusted to careless and untrained hands damage is certain, and it is impossible to estimate the amount of injury to works of art that has been effected by ignorant picture-restorers.

Proper care of a picture, however, and preservation from damp and dust, will obviate the necessity for its being subjected to restoration; and such precautions are the best of all, and the best of all to prevent the closing in its back, and by covering its surface with glass, which answers all, and more than all, the preservative purpose of varnish, with the additional advantage that it does not chill and discolour with time. Glass is being largely adopted in the great public galleries, for covering existing pictures, and it has only one disadvantage—its tendency to reflect the objects placed opposite it, and so to interfere with the ready and complete examination, as a connected whole, of the entire surface of a large, and especially of a dark, painting.

Resurrection. This expression denotes the revival of the human body in a future state after it has been consigned to the grave. We find traces of this doctrine in other religions, in Zoroastrianism, and especially in later Judaism, but it is not known to occur in Christian literature until the 16th century. In the earlier Hebrew Scriptures there is no mention of it. It is not to be found in the Pentateuch, in the Psalms, nor even in the earlier prophecies. It is supposed to be alluded to in Isaiah (xxvi. 19), and in Ezekiel (xxxvii.) in the well-known chapter as to the revival of dry bones in the valley of vision; and in the last chapter of Daniel (xii. 2) there is the distinct affirmation that 'many that sleep in the dust of the earth shall awake, some to everlasting life, and some to shame and everlasting contempt. There is also a well-known passage in Job (xix. 25-27) which was long thought to refer to the doctrine of the resurrection of the body; but all recent critics deny the validity of this reference. It is thought to be an allusion to the statement that the doctrine appears, and it is sometimes said, doubtfully, to have been derived from Persia or elsewhere. In the time of our Lord it had become a formal doctrine of the Pharisees. The general body of the Jewish people seem also to have believed in it; the Sadducees alone disputed it. It appears, in fact, to have become bound up in the Jewish mind with the idea of a future life, so that an argument which proved the one proved the other. It should be added that, Mohammedanism (q.v.) cherishes gross beliefs on this head.

It remained for Christ and His apostles to reveal clearly the doctrine of the resurrection of the body, and to connect it with the fact of Christ's own resurrection as its special evidence and pledge. The following arguments are involved in the doctrine as revealed in the New Testament: (1) The resurrection of the dead is ascribed to Christ Himself; it will complete His work of redemption for the human race (John v. 21); Cor. xv. 22 sq.; 1 Thess. iv. 14; Rev. i. 18). (2) All the dead will be raised in the last day to receive judgment according to their works, 'they that have done good, unto the resurrection of life; and they that have done evil, unto the resurrection of damnation' (John v. 21-29; 1 Cor. xv. 22; Rev. xx. 11). (3) The resurrection will take place at 'the last hour,' by which seems to be meant the close of the present world (John vi. 39, 40, xi. 24; 1 Thess. iv. 15). (4) The great event is represented as being ushered in by the sound of a trumpet, a representation probably borrowed from the Jewish worship, as the sounding of the trump in the sound of trumpet (1 Cor. xv. 52; 1 Thess. iv. 16). (5) As to the character of the change through which our bodies are raised after the lapse of ages, and yet retain their identity preserved, there is nothing distinctly made known. The possibility of such a change was evidently a subject of argument in the primitive Christian age, and the apostle argues strongly in its favour (1 Cor. xv. 22 sq.) from occurrences which are scarcely less mysterious in the natural world.

The Gnostics denied the resurrection of the body, and made the change a purely spiritual one. The Catholic belief was greatly developed by Tertullian, Jerome, and Augustine, who, however, insisted that the resurrection body, though identical with the original one, is a glorified body. A third view, represented by Origen at an early date and by Modestus of Emesa, and especially by Rothe, affirms that the spirit must always have a bodily organism, and that the perfected personality necessarily assumes a spiritualised embodiment; in this view resurrection is limited to perfected spirits.

See also the articles IMMORTALITY, CONDITIONAL IMMORALITY; also those on HEAVEN and HELL. There is a full bibliography in Alger's History of the Doctrine of the Future Life (Phila, 1864); see also the Excurseus in Geddes's Commentary on St John; Westminster Gospel of the Resurrection (1866; 5th ed. 1884); and Masen's essay on the Resurrection of Jesus Christ (1877).

Resurrectionists, or Body-snatchers, the names popularly given to those who made it their business to dig corpses out of their graves and sell
them as 'subjects' to lecturers on anatomy. Gradual progress in the science of anatomy led to its more thorough study by greatly increased numbers, and it is ordered that all the males of the 18th century professors of anatomy found that the supply of subjects, heretofore mainly obtained from the bodies of executed criminals, was altogether inadequate to meet the wants of the surgical and medical schools. The resurrectionists invented two systems to supply the lack, and in the first quarter of the 19th century drove a most flourishing trade—the graveyards in the outlying parts of London being especially the happy hunting-grounds of the confraternity. As the business became organised, grave-diggers and sextons were bribed to remove gravesyards unlocked and keep out of the way when a body was being raised. A very short time, usually at dead of night, sufficed; an expert pair of resurrectionists being able in about forty-five minutes to prise up the coffin out of a newly-made grave by means of a peculiar crowbar for the purpose, to burst in the lid, and remove the corpse. Corpses reanimated after this fashion seem to have been worth £8 or £10—offering large profits and quick returns to this precarious and risky trade. The body-snatchers carefully replaced the clothing in the coffin; the stealers resold corpses, and for the latter in England a misdemeanour only, whereas the removal of the clothes was of course a felony, punishable by transportation. So notorious did the practice of resurrectionism become that in many parts of the country painful precautions against it were regularly taken; heavy gratings were securely fixed over new-made graves, spring-guns were set, and often the relatives of deceased persons sat armed by their graves night after night until it was assumed that the corpses would be no longer serviceable to 'the doctors'—a custom that survives to this day. Hiding-masters or towers were sometimes built for the accommodation of the watchers. To the popular horror of this degraded calling, recruited from the worst classes, was added a strong suspicion that resurrectionists would on occasion murder—a suspicion based in the notorious case of Burke and Hare (see Burke, William). The passing of the Anatomy Acts of 1832 and 1871 rendered the lucrative trade of the resurrectionist superfluous; but in out-of-the-way places there are still traces of the old terror of bodies being secretly disposed of. (q.v.)

Retainer is, in English law, the act of engaging an attorney or counsel to attend to a certain suit or cause. The retainer of an attorney may be either verbal or in writing; but the retainer of counsel is usually by written memorandum handed to his clerk, together with a small retaining fee. A general retainer is given by a party who wishes to secure the services of counsel in all actions brought by or against him, and is also used to denote the right of an executor to retain a debt due to himself from his testator's estate.

Reford, East, a market-town of Nottinghamshire, on the right bank of the Idle, an affluent of the Trent, 24 miles E. by S. of Sheffield and 138 NNW. of London by the Great Northern Railway. It has a handsome town-hall (1867), a grammar-school (1552; rebuilt 1858), paper-mills, iron-foundries, &c. It was first formally incorporated by James I., the municipal boundary being extended in 1878. The parliamentary borough was extended in 1829 to take in the whole parliamentary area of the town. See also Reford

Retina, see Eye.

Retinophora. See Cypress.

Retirement of officers from the British army is governed by royal warrants issued from time to time. As a rule, the 22nd century offers officers to retire voluntarily with gratuities or pensions, and oblige them to retire at certain ages, or after a period of non-employment, on half-pay. Voluntary retirement on a gratuity of £1200 is allowed to officers other than those of the Indian Staff Corps, the Royal Engineers, the Royal Milta Fusilier Artillery, Riding-masters and Quartermasters (q.v.), after twelve years' service, and to others on a pension according to rank and service. With certain modifications, the maximum rates are: £150 a year, for lieutenants, £700; £250 for major, £800 to £1300; £170 to £250 for lieutenant-colonels and colonels, sixty-two for major-generals, and sixty-seven for lieutenant-generals and generals. Non-employment for five years in any rank also entails retirement. Officers of the Indian Staff Corps and captains of the Royal Engineers do not come under these rules. The pensions granted in cases of retirement for age are, generally speaking, £50 more than those cited above, but for the three ranks of general officers they are £600 to £700, £750 to £850, and £900 to £1000 according to age. Certain additions, generally in the form of gratuities, are allowed to purchase officers and officers of the late East India Company's Artillery and Engineers, in consideration of their service. The officers of the Coast Artillery of the Indian Staff Corps are subject to regulations laid down from time to time by the Secretary of State for India. They are considerably larger in amount than those granted to the other branches of the service, and are affected by numerous rules. In full uniform, more than half a pension can be earned by less than twenty years' service. Officers of the Coast Brigade Royal Artillery and
Coast Battalion Royal Engineers, inspectors of army schools, riding-masters, and quartermasters can earn a maximum pension of £200 a year, or the two first-mentioned classes if retired for age (five-five years) may receive the full pay of their rank.

For the Royal Malta Fencible Artillery the maximum rates of retired pay are: captains, £200 a year; majors, £200; lieutenant-colonels or colonels, £365.

Departmental officers receive retired pay at rates corresponding to those granted to other officers and on similar conditions as to age. Some of the highest rates are chaplain-general, £600; commissary-general, £800; director-general, Medical Staff, £1125.

The army estimates for 1891-92 provide for a total of £1,883,652 on account of retired pay and gratuities (£1,543,950), half-pay (£73,530), allowances to widows, &c. (£164,563), rewards for distinguished services (£12,400), pensions for wounds (£15,200) for officers; for warrant officers and non-commissioned officers, £1,856,207. In 1896-99 the corresponding figures were £1,938,206 for officers, and £1,802,335 for warrant officers, &c.

In the navy officers are placed on the retired list at sixty-five years of age if admirals or vice-admirals, sixty for rear-admirals, fifty-five for captains, fifty for commanders, and forty-five for lieutenants, with the option in each case of retiring five years earlier. Lieutenants and commanders are also retired compulsorily if they have not served for five years afloat, captains after seven years without service, and flag-officers after ten years. In 1891-98 there were some 2300 naval and marine officers on the retired list, costing about £790,000 a year. See PENSIONS, DISCHARGE.

**Retort**, a vessel employed by chemists for the purpose of distilling or effecting decomposition by the aid of heat. It may be made of glass, earthenware, or metal, according to the purposes for which it is to be employed. Glass retorts are the most common, and their ordinary form is seen in the figure. They may be employed for the production of such products as do not require any extraordinary degree of cold for the condensation of their vapour—as, for instance, for the production of hydrocyanic or nitric acid. The globular vessel in which the neck of the retort is inserted is from its function termed the receiver. Cold may be applied to the neck of the retort—for the purpose of condensing the vapour—in various ways, as by the application of a cold wet cloth, by a current of water, or by a special apparatus known as Liebig's Condenser, shown in the figure at BB.

In ordinary cases requiring a higher temperature than glass could bear earthen retorts are used; for the preparation of hydrochloric acid retorts of lead are employed; while for the preparation of sulphuric acid platinum is the best material for the retort. Iron retorts are employed in the laboratory for the preparation of oxygen from black oxide of manganese and some other processes, and in gas-works for the destructive distillation of coal. See DISTILLATION.

**Retours.** See RECORDS (Scotland).

**Retreat**, a period of retirement to a religious house, for self-examination, meditation, and prayer. Retreats commonly last either three or seven days, and are conducted by a cleric, who delivers addresses daily. They are in use both in the Roman and, among the High Church party, in the Anglican Church.

**Retriever.** As the name implies, the retriever is a breed of dog trained to find out and bring back any killed or wounded game. The work of the retriever was long done by various breeds of dogs, such as the pointer, setter, or spaniel, but, in addition to it spoiling these dogs for their regular work, they have resulted in the worst fault possible in a retriever, as he wastes more in game injured than would have been lost without him. Crosses with the Newfoundland were tried, and gradually two kinds of retriever were introduced. One variety, known as wavy-coated, was probably the result of a cross with the setter; and the other, known as curly-coated, is from the water-spaniel or poodle. Not much attention was paid to the retriever until the introduction of dog shows, about 1850, but since that time the breed has been kept free from any fresh cross, with a great improvement in the appearance. The two varieties of retriever differ only in coat; the curly coat should curl closely and firmly all over the body, the wavy coat should fall straight and thick. An intelligent large head, with a full clear eye, should always be seen in the retriever. Legs and feet need to be large and strong. The retriever should not be too small, as it needs a powerful dog to retrieve a bare successfully. The retriever makes a very good watch-dog, and numberless bad specimens of the breed are to be found fulfilling this unseasonable task. The pure retriever is gentle in temper and easy to command.

**Retrograde,** in Astronomy, a term applied to the motion (real or apparent) of a celestial body when that is opposite in direction to the yearly course of the sun from west to east. The superior Planets (q.v.) retrograde when in opposition (see CONJUNCTION). As their motion is then nearly parallel to the earth's, they moving more slowly than it, appear to fall behind for a time. This period of retrogradation is of course longer for the planets whose motion is slower, and less for those whose speed more nearly approaches that of the earth. The inferior planets, which move faster than the earth, retrograde when in inferior conjunction. Their course being then nearly parallel to the earth's, they gain upon it, and appear to pass the sun from east to west. Thus Venus, when nearing the end of her appearance as an evening star, descends each night nearer to the western horizon, until so near the sun as to be lost in his rays. Passing then to his west side, the planet reappears as a morning star.

**Retz, Jean François Paul de Gondi, Cardinal de,** born at Montmirail in 1614, of a family originally Italian, that had acquired great estates in Brittany and formed connections with the noblest families of France. His uncle was Archbishop of Paris, and he was early destined for the church in spite of amours, duels, and every
form of clerical behaviour. A friend reproaching him with his debts, "Cæsar," said the splendidly young man, "pay me as much as I do." Retz was entangled in political intrigues from his childhood up, even under the watchful eye of Richelieu, and, having at length in 1643 obtained the counterpoise with reversion of the archbishopric of Paris, he skillfully used the position for personal objects devoted to himself. He plotted actively against Mazarin, and was one of the main instigators of the outbreak of the Fronde in October 1648. During the next four years he rose and fell with those of fortune. In 1702, when he was flung into prison, first at Vincennes, then at Nantes. After two years he made his escape, wandered in Spain and England, appeared at Rome—where, it is said, he secured the election of Pope Alexander VII.; and at length in 1662 made his peace with Louis XIV. by resigning finally his claim to the archiepiscopal in exchange for the abbacy of St Denis and restoration to his other benefices, with arcars. He spent the rest of his life mainly in quiet at Paris, at Commercy, and St Mihiel in Lorraine. His enormous debts, reaching to four millions of francs, his peculiarity of having three successive masters, called to him, for his creditors, making over to them his whole income save 20,000 livres. He died at Paris, 24th August 1679.

Retz was connected by marriage with Madame de Sévigné, and figures in a perhaps too pleasant light in her delightful letters. His Mémoires, coming down but till 1655, throws much light on the dark and troubled intrigues of the Fronde, and displays quite remarkable skill in narrative and elaborate character-drawing. His own character has been sketched with faithful, if unkindly, truth by his great antagonist, La Rochefoucauld, and the sum of the whole is contained in the words: 'He has raised up the greatest disorders in the state without having formed any plan how to profit by them.'

The earliest edition of his masterpiece in a kind peculiar to French literature appeared at Nancy in 1717, but the first adequate edition was for ever lost. It was in the 3 vol. of Micheaud and Pouyat's collection (Paris, 1836). Later and better editions are by Gérard (1844) and Champollion-Figeac (1859); but the best is that in the series called Miscellanea Francisci, of which four editions have been printed by A. Le Guillot, and at Chatelaine (10 vols. L-x, 1872-88). See works by Carney (2 vols. 1863), Topin (31 ed. 1872), Chatelaine (3 vols. 1877-87), and Gazer (1877). - R. H. S.

Retz, HANS, or RAUZ, GILLES DE, a 15th-century monk of iniquity, was a licentiate of high rank and family connections, who distinguished himself under Charles VII. in the struggle with the English, by fighting by the side of the Maid of Orléans, and bearing the alms-bowl at the coronation of the king. He was made marshal of France in 1430, and soon after, in 1432, was made bishopric of Chartres. Retz, who has been accused of having indulged in the most infamous orgies, having kipampioned or enticed to his castle as many as 150 children, who were sacrificed as victims to his unnatural lusts or his sorceries. He was at length hanged and burned at Nantes in 1446, and then, after a closed by the church conference. It should be noted that the whole story is by no means free from suspicion, and, moreover, that both the Bishop of Nantes and the Duke of Brittany were active personal enemies of Retz. Attempts have been made to find in him an historical original for 'Blanche!' by persons ignorant of the world-wide diffusion of stories of forbidden chambers and punishments for curiosity. See Haringe Gould's Book of Wore-Wolves (1865).

Retsch, FRIEDRICH AUGUST MORITZ, painter and engraver, was born in Dresden, 9th December 1779, and studied at the academy of his native city, where he was a professor in 1824. He died 11th June 1857. He has acquired great celebrity by his etchings in outline of Schiller and Goethe—those of Goethe's Faust being particularly well known—Fonque's tales, and Shakespeare. His masterpiece is 'The Chess-players' ('Man against Satan'). Retzsch was a Master of Art in 1828.

Reuchlin, JOHANN, also known by his Greek name of CAMPUS, humanist and one of the first promoters of Hebrew studies in Germany, was born at Pforzheim in the Black Forest, 28th December 1455. He received his earliest education at Schlettstadt, and in 1473 was appointed travelling companion to Prince Francis, of whose capacity he visited Paris, where he studied Greek under Hermogenes of Sparta, besides assiduously practising the composition of Latin. Two years later Reuchlin went to Basel, where he continued his study of Greek, and wrote his Latin dictionary, Vocabularium Breviscopum (1476). In the same year he paid a second visit to France, studied law at Orleans (1478) and at Poitiers, then, returning to Germany (1481), set up as lecturer at Tübingen. In 1482 and again in 1490 he was in Italy on the business of Duke Eberhard; in 1489 we find him at Basle, and in 1502 at Innsbruck. In 1506 he had a dispute with D. J. Lollard, the imperial physician. In 1496 Reuchlin went to Heidelberg, where he became the main promoter of Greek studies in Germany, though not a public lecturer. In 1498 he was sent to Rome by Philip the Elector-palatine, and applied himself more vigorously than ever to the study of Hebrew and Greek. Reuchlin returned to Stuttgart in 1499, and in 1500 obtained a judicial appointment. In 1506 appeared his Rudimenta Lingae Hebraicae. His Hebraic studies, which embraced the post-biblical Jewish literature, were drawing him into intimate struggle with learned Jews, Jewish promoters, and the Dominicans, and directly and powerfully helping on the Reformation. It was in 1510 that Johann Pfeifferkorn, a Jewish proselyte, in the true spirit of a renegade, called upon princes and subjects to persecute the religion of his fathers, and especially urged this upon the emperor and his court. Books except the Bible. Reuchlin remonstrated, maintaining that no Jewish books should be destroyed except those directly written against Christianity. This tolerant attitude drew upon Reuchlin the enmity of the Dominicans, and particularly the inquisitor. In 1513 at Heidelberg, where these prophecies of Reuchlin held possession of the universities of Paris, Louvain, Erfurt, and Mainz; but all the distinguished and independent thinkers in Germany were on the side of the brave and humane scholar. Among the Reuchlinists we may especially mention the names of Ulrich von Hutten (q.v.) and Franz von Sickingen (q.v.); and to this controversy we owe the Epistolae Observatorum Virorum (q.v.). A quarrel broke out between Ulrich Duke of Württemberg and the Swabian League, in the course of which Reuchlin became a prisoner of Duke Wilhelm of Bavaria, however, in 1516 appointed him professor at the university of Ingolstadt. In 1522 the plague broke out at Ingolstadt, and Reuchlin taught once more for a term at Tübingen, but soon after fell sick and died at Liebenzell, near Hirschau, on the 30th of June.

Reumont, ALFRED VON, a German historian, was born at Aix-in-Chapelle on 15th August 1806, and died there on 27th April 1887, having from
Reunion, formerly called Ile de Bourbon, an island belonging to France, and lying in the Indian Ocean, 115 miles SW. from Mauritius and 330 E. from Madagascar. An ellipse in shape, it has an area of 764 sq. m., being 58 miles in length and 28 in breadth. It has an estimated population of 33,000 negroes and nearly 30,000 natives of India. The backbone of the island is a volcanic range, culminating in two highest peaks, the Piton de Neiges (10,696 feet) in the centre of the island, and in the south-east Piton de Fournaise (3612 feet), one of the most active volcanoes in the world. The central parts of the island between these volcanic peaks consist of plateaux and terraces, separated by deep cauldron-shaped valleys and narrow, but profound, gorges and ravines. Piton de Fournaise is surrounded by a vast dark forest, reserved the Pays Bois ("Primeval Land"). Except in the mountainous parts the soil is in general very fruitful. The scenery is often beautiful. Streams, although not large, are very numerous, and fall in cascades to the sea. The chief rivers of each state are called the Gathy. Rainfall averages 45 inches in the year. Cyclones sometimes occur during the hotter and rainiest part of the year (November to April), and high springs- tides occasionally do serious damage during the remaining drier months. One-third of the island is cultivated, one-third is forest, and one-sixth is grass-land. Tropical fruits, sugar (the staple crop), coffee, vanilla, cinchona, maize, vegetables (potatoes, &c.), spices, tobacco, and similar products are grown. The total trade is estimated at £1 million sterling—exports, £550,000; imports, £700,000 to £900,000. By far the most important of the export goods is sugar (£140,000); coffee, vanilla, rum, potatoes, and tapioca are the other chief exports. The imports consist principally of rice, cotton, and in a secondary degree barley, live cattle, fish, grains, oil, eggs, flour, and cloth. The capital of the island is St Denis, and the chief port of the island is Salazie, with warm mineral springs, a health-resort of 6000 inhabitants. The coast towns are connected by a railway 78 miles long. The colony costs France some £170,000 every year, and is administered by a governor and a council of thirty members. Reunion and Mauritius were discovered by the Portuguese navigator, Masearenhas, and named after him the Masearen Isles. The French took possession of this island in 1648, and called it Island of Bourbon, which was afterwards changed to Reunion, and to Isle Bonaparte in 1809. Reunion has been the official name since 1848. The island was in the possession of the French from 1810 to 1815.

See Bory de St Vincent, Voyages (1804); Maillard, Note sur la Reunion (1862); Roussel, 1'ile de la Reunion (4 vol. 1860); and W. J. Oliver, Crois et Cratres: Ramble in Reunion (1897).

Reuss, a town of Spain, 58 miles by rail SW. of Barcelona and 4 N. of its seaport, Salou. The prosperity of the place dates from about 1750, when a number of English merchants settled there. It is a busy centre of the cotton, silk, and silk ribbon industries, including all kinds of manufactures soap, brandy, and leather. Pop. 27,503.

Reuss, a tributary of the Aar in Switzerland, rises on the northern face of the St Gothard, flows northwards past Andermatt and Amsteg, between which places its bed lies at the bottom of a wild and narrow gorges, and by great precipices and other wonders of Swiss roadmaking, and enters the southern end of the Lake of Lucerne. This it leaves again at its northern end, at the town of Lucerne, and, still going due north, reaches the Aar near Windisch (Aargau). Its length is 90 miles; its basin 1317 sq. m.
stomach created in him an abnormal craving for strong drink, which he never conquered. It was eleven years more before he settled down to his life's work. Meanwhile, his income, 1727, in the meantime turned his back upon him as a good-for-nothing, he tried to resume his legal studies, learned farming, taught pupils, but lived chiefly on the kindness of a friend and on a small annuity left him by his father, who died in 1843. Reuter began to write again in High German; but having turned them into rough verse form, in Low German, the jokes and merry tales of the countryside, he published them—Lauschen um Rînelis (1838; 18th ed. 1889), and the book became at once a great favourite with all who spoke and read Low German. Two years later he wrote an equally successful Low German poem, Heis'nah Beldgen (12th ed. 1884), describing in broad humorous fashion the journey of certain peasants to Belgium in search of culture. The next seven years (1856–63), passed at Neubrandenburg, were the period in which he wrote his greatest books. The first of these was a second volume of Lauschen um Rînelis (1855; 15th ed. 1889), and the deeply tragic poem Kein Hüung (1858; 11th ed. 1901), picturing the wretchedness of the semi-serfs on the great Mecklenburg domains. The rest, except Heine Nute (1856), a pendant to 1844, a poetic novel in which birds prominently as speaking characters, were all written in prose in Low German (Platt-Deutsch), and were published under the general title of Olette Kamellen, which may be given in English as Old-time Stories. These books, more especially the latter, 17th ed. 1883; Eng. trans. as The Year '73, 1873), Ut mine Festungstîl (1862; 15th ed. 1901), and his masterpiece, Ut mine Stromlit (1862–64; 17th ed. 1901), spread Reuter's fame abroad through all Germany, and lifted him to the proud position of Germany's greatest humorist next to Jean Paul; as a literary artist he ranks in many respects above Jean Paul. These tales have the indubitable flavour of real life: they deal with the characters and doings of rural Mecklenburg, are told with the verve of the born story-teller, and are leavened in the purest and most charming style of his native language. Reuter is master of a tender pathos. Uncle Brissig in Stromlit is one of the greatest creations of German literature. The best witness to Reuter's own character is the history he wrote (Ut mine Festungstîl), particularly as he appeared in prison; the book has not one word of bitterness or a single trace of revengeful feeling throughout; good-nature and humour are its dominant notes. Besides the works quoted, Reuter also wrote Schurri Mur (1861; 11th ed. 1886), sketches of country life, partly autobiographical; Doroishuutschig (1866; 11th ed. 1886), a kind of humorous historical novel; the satirical Ursichtig von Meckelsburg (1874), and others. Reuter lived at Eisenach in Thuringia, at the foot of the Wartburg, from 1863 till his death on 12 July 1874.

His Sämtliche Werke were published in 13 vols. at Wismar in 1873–83; to these Adolf Wilbrand added two more in 1875, together with a biography. The 7 volumes of a popular edition (1877–78) have each gone through several editions. Other biographies of him have been written by Glagen (21 ed. 1875) and Ebert (1874). See also Gaedert, Fritz-Reuter-Relebungen (1885) and Reuter Studien (1890), and consult McCallum's Studies in Low German Literature (1884).

Reuter. HABON PAUL JULIUS, well known from the familiar newspaper heading 'Reuter's Telegram,' was born at Cossel, 21st July 1821. In 1841 he learned the printing trade, in 1843 he formed in Paris a partnership for collecting (partly by pigeon post) and transmitting by telegraph commercial and financial news; and in 1851 he transferred his headquarters to London. As telegraphs extended throughout the world he multiplied the ramifications of his system till it embraced the remotest regions. He never induced his partners but an earnest and persevering man, Reuter did not reach—e.g. between Pekin and Kinhia. In 1865 Reuter converted his business into a limited liability company, and in 1871 he was made a baron of Germany. In 1872 the Shah of Persia gave him the sole right of making railways, working mines, in so far as they witness to us the most remarkable events, which were tried and annulled in 1890, when the concession of the Imperial Bank of Persia was conferred on him. He died 221 February 1869.

Reutlingen, a town of Württemberg, 8 miles E. by S. of Tubingen and 20 S. of Stuttgart. Many of its houses are old and picturesque. The church of St Mary (1247–1343), with a tower 243 feet high, is a noble Gothic edifice. Woollen and cotton yarns are spun, and cloth, leather, cutlery, hosery, paper, &c. are manufactured. Reutlingen was formerly a free imperial town and a member of the Swabian League; it came to Württemberg in 1802.

Pop. (1890) 18,542.

Reval, or Revel, a Russian seaport, capital of Estonia, stands on a small bay on the south side of the Gulf of Finland, opposite Helsinki (52 miles distant), and 282 miles by rail WSW. of St Petersburg. It is divided into the (old) upper and (new) lower towns. The former is the cathedral, the castle, governor's residence, and the houses of the (German) nobility. The new town extends outside the city walls. There are several medieval guild-houses, in some of which are preserved valuable archives, and an important museum of antiquities. Revel exports cereals (chiefly oats), spirits, flax, and other commodities to the value of more than 23 millions sterling; and imports cotton, coal, and other goods to the value of 62 millions. There is little industry, brandy, vinegar, and wool being manufactured to a small extent. Pop. (1897) 64,578, of whom more than one-half were Estonians, and nearly one-fourth of German descent. Reval was founded by Waldemar II. of Denmark in 1219, and became a flourishing Hanse town. It was long held (from 1346) by the Livonian Knights, was made over to Sweden in 1561, and was besieged by Peder the Great of the Russian empire in 1710. In 1713 a naval harbour was founded. See works by Bunge (1874), Aumühl (1884), and Hansen (3d ed. 1885).

Revalenta Arabica. See Lentil.

Revellé (the true French form being reefé), the morning call for troops. See Bugle.

Revelation is a familiar theological expression, commonly applied to the knowledge of Himself which God has given to man in Holy Scripture. In itself, however, the word is properly used not merely of the divine knowledge communicated to us in Scripture, but of all divine knowledge communicated through whatever source. Conscience and reason are in themselves means of revelation. In so far as we are witness to the divine laws which bind our moral life, and in harmony with which the health and happiness of that life can alone be found. History is also a species of revelation, unfolding, as it does, the same divine laws collectively in the race. Then nature reveals to us the divine wisdom, goodness, and beauty; and science, the interpreter of nature, in so far as it makes known the great laws governing the material universe, truly makes known the divine will to us. But it is with the Scriptures of the Old and New Testament that the idea of revelation is all but necessarily identified. The Holy Scriptures are by all Christians regarded as in a special sense the medium of divine revelation to the human race; God having therein made known more fully and
clearly than elsewhere His will and character. But at the same time we must not confound revelation, in its fact and essence, with the books of Scripture. These books are only the highest or most distinguished form or medium of revelation, which, in its true sense, implicates simply communication from one mind to another, and, in a religious sense, from the divine to the human mind. Scripture is, in its several books, regarded as the pre-eminent medium of this contact or interchange of the divine and human, as the record of special communications from God to His ancient and holy men, who spake as they were moved by the Holy Spirit. It contains, in short, a revelation for us; but the revelation is not the record, but the knowledge which the record conveys to our minds. See Bible, Inspiration.

Revelation, Book of, the last book of the New Testament canon. Tradition.—In the oldest extant MSS. the title is simply 'Apocalypse' [i.e. Revelation] of John ('Apokalypsis Ioannis'), and thus does not go beyond what the book itself declares. The further designation of the author in the textus receptus (fully accepted Version) as John 'the divine' has no good MS. authority, but is an echo of the undoubtedly early tradition which identifies him with the author of the fourth gospel (who was called theologos, translator, of the divine, first by Euselius, because he begins his gospel with the earthly anology of Jesus but with the doctrine of the divinity of the Logos), and of the tradition which identifies the author of both works with John, the son of Zebedee, one of the twelve apostles. Other comparatively ancient names for the title ('Chiliastic', 'mythical') in time past to be rejected in this sense, are 'The Revelation of John the Divine and Evangelist,' and 'The Revelation of the Apostle and Evangelist John.'

The 'Apocalypse of John' is included in the Muratorian canon; it was also reckoned by Origen among the 'homoioiopana' or 'acknowledged' books of New Testament Scripture. It was held in high esteem by Irenaeus, Hippolytus, Clement of Alexandria, and Tertullian. Justin Martyr (circa 147) makes reference to it as the work of the apostle John, and it was used by Theophilus of Antioch (circa 180) and Clement of Alexandria and commented on by Melito of Sardis (circa 170). Outside the Catholic Church it was accepted by the Montanists. On the other hand, it was rejected by those whose Ephesians calls Abiell and by the Marchen, while the so-called Revelation of Barlaam and Josaphat were rejected by an ecclesiastical named Gaius or Caius; his arguments in turn were controverted in an apologistic writing by his contemporary, Hippolytus. It is mentioned as one of the 'antilegomena' or 'disputed' works by Euselius; it is absent from the Syriac, and from the MENA and Thebaie (Egyptian) versions of the Scripture, and from the lists of Cyril of Jerusalem, Gregory Nazianzen, and Chrysostom, as well as from the canon of the Council of Laodicea, and from the so-called 'Clementine' (circa 150). There is no trustworthy evidence that Papies knew it.

As regards authorship, the book itself claims to be written by 'John, the servant of Jesus Christ,' 'who bare witness of all things that he saw;' and it is to be observed that many of the incidental references to events which were very recent, and repetitions of this statement. But the reception of the Apocalypse into the canon was no doubt partly determined by the belief that this John was the son of Zebedee. This belief is implied in the Muratorian canon, and the reference of the apostle is carried forward by Justin Martyr and Irenaeus. Dionysius of Alexandria (circa 250), however, while not disputing the canonicity of the book, found himself unable to overcome the arguments of certain who had preceded him against its apostolic authorship, and he accordingly assigned it to 'some other' John—perhaps (he thought) John the Presbyter. Ensenius with some definiteness assigned it to the last named.

As to the date of its composition, its tradition is far from consistent. The author of the Muratorian fragment, for example, incidentally places it earlier than the Pauline epistles; but Irenaeus expressly states that it 'was seen towards the close of the reign of Domitian.' This statement of Irenaeus is in harmony with the passage just quoted (4, iii. 2) where it is said that the book was also written then; but more probably he intended his readers to understand that it was written after Domitian's death—under Nerva, or perhaps even in the reign of Trajan, to which period, according to Irenaeus, the apostle survived. But Tertullian seems to suggest the time of Nero as the date. Jerome dates the supposed banishment of John certainly, and the writing probably, in the 14th year of Domitian; but in this, perhaps, he is only repeating Irenaeus. There is some reason to think that this date is partly derived from an interpretation of the book as a whole, which was undertaken by any ancient writer. Attention was for the most part confined to two or three isolated points. It need hardly be said that, as regarded the millennium, the ancient church was entirely of the 'futurist' school, and that in those quarters where the Apocalypse was most prized as an authentic vision of the future—the interpretation always tended to be literalist and 'chiliastic.' As for another conspicuous feature—the beast and the number of the beast (see Apocalypse Number)—it is surprising how early the key to this enigma seems to have been lost. Irenaeus confesses ignorance, and even rejects the interpretation professedly given by the church and delivered from tradition.

The discussions of the Apocalypse by Melito and others have not been preserved; but from the earliest extant commentary—that of Victorinus (circa 300)—it may be inferred that no systematic attempt at a consistent interpretation of the work as a whole was undertaken by any ancient writer. Attention was for the most part confined to two or three isolated points. It need hardly be said that, as regarded the millennium, the ancient church was entirely of the 'futurist' school, and that in those quarters where the Apocalypse was most prized as an authentic vision of the future—the interpretation always tended to be literalist and 'chiliastic.' As for another conspicuous feature—the beast and the number of the beast (see Apocalypse Number)—it is surprising how early the key to this enigma seems to have been lost. Irenaeus confesses ignorance, and even rejects the interpretation professedly given by the church and delivered from tradition.

Victorinus, however, explained Rev. xii. 3 as having reference to Nero; and so also did Stilpius Severus. To Origen and the Alexandrians, with their allegorising methods of interpretation, the problems of the Apocalypse were of comparatively little interest. Later, after the time of Constantine, the 'beast' was identified with pagan Rome, or the seven heads of the beast with seven world-empires, and Augustine was one of the first to give currency to a form of 'preterism,' holding that the millennium began with the Christian era—a belief which again became active in the 11th century. With the lapse of time came almost inevitable modifications, both of the preterist and of the futurist view, alike among those who held that the threefold series of events (seals, trumpets, vials) in the book related to chronologically successive events, and to those who, with Augustine, viewed them as parallel (theory of 'recapitulation'). Medieval sects recognised the papacy in the woman on the scarlet beast, an interpretation which very rightly was not adopted by the Protestant domain, and still holds its ground in many quarters.

Modern Criticism.—The modern criticism of the Apocalypse may in a sense be said to have begun with Luther. The most famous passage of his New Testament (1522) declared that for many reasons he was unable to accept this book as either apostolic or prophetic. 'My spirit cannot adapt itself to the book.' The chief reason he alleged
were the little prominence it gave to Christ, and the peculiar manner of its teaching, so unlike the rest of the apostolic teaching or that of Christ himself. In 1530 he somewhat modified the language he had used, but he never withdrew his unfavourable judgment of the Apocalypse. From then till almost the close of the 16th and 17th centuries (Carlstadt, Flacius, and others) was that the Apocalypse can claim at best only the third and lowest degree of canonical authority. Zwitigl in 1528 refused to regard it as Scripture or to admit the validity of the problems it raised. The Apologists from Justin onwards abstained from commenting on it. Its 'deutero-canonical' character, however, was never made prominent in Britain, and was gradually lost sight of even in Germany. Mention may perhaps be made of the English work of Abauzit on the Revelation (1730), which called forth some controversy at the time of its appearance; but, strictly speaking, the discussion of the critical problems of the book did not enter upon its modern phase until the time of Semler, 'the father of modern biblical criticism,' who in 1769 and following years, from a comparison of the Apocalypse with the New Testament, arrived at the conclusion that an apostolic authorship could not possibly be claimed for both, and, starting from this canon, denied it to the latter. The same view was taken up by Schleiermacher and his immediate disciples, the most brilliant of whom—De Wette—ultimately gave up this 'disjunctive canon' as one of the most firmly established conclusions of modern criticism (1826); so also Ewald (1828). To obviate the force of some at least of Semler's arguments, those who wished to maintain the apostolic origin of both works found it important to make out an earlier date for the Apocalypse than was currently accepted tradition, following Irenæus, had assigned to it. In their efforts to do so they were powerfully supported from 1845 onwards by the Tubingen school, which had also accepted the 'disjunctive canon,' though choosing the opposite alternative to that adopted by Schleiermacher, and maintaining the apostolic character of the Apocalypse, ranking it indeed as one of the five undoubtedly genuine remains of the apostolic age (Haur, followed by Schwengler, Zeller, S. Davidson, &c.). Various opponents of the Tubingen school followed Semler and claimed the non-apostolic character of the Apocalypse at least. Thus, Lücke and Neander attributed it to some unknown John; Ewald, Bleek, Dübner, and the presbytery of the Apocalypse. Hitzig to John Mark. Meanwhile all sections of the historical school of exegesis were at one in the effort to see and if possible understand the book in the light of the actual circumstances of its writer. Among the details that came into greater clearness were the historical references in the beginning of chapter vii, the indication of date supplied by xi. 1, 2, and a very probable explanation of the Celcius (so called) which was first given by Fritzsch in 1831 and afterwards rediscovered, independently it is said, by Renøy, Hitzig, and Reuss in 1837. Much of the evidence pointing to an early date for the book was, as already indicated, specially welcome to those who still maintained the apostolic authorship alike of the Gospel and of the Revelation, for it was becoming increasingly plain that the differences of language and conception between the two works were peculiarly inexplicable if both were assumed to belong practically to the same period in the life of the Church.

On the other hand it was felt to be difficult wholly to set aside the traditions which pointed to a later date, especially as these best explained some of the doctrinal peculiarities of the book, and many of the phenomena presented by the condition of the 'seven churches' to whom the book is primarily addressed. The two-sided character of the evidence, both external and internal, as to date is indeed obvious when one looks at it with any care; and as early as the middle of the 17th century it had occurred to Grotius (1644) that the problem raised by its authorship was of such a nature, that the assumption that the book was written by its one author at different times, partly in Patmos and partly at Ephesus. Vogel in the beginning of the 19th century (1811-16) offered a different solution—that it was written partly by the apostle John and partly by the author of the Apocalypse, a theory that was found to have had some attraction for Schleiermacher, and, temporarily at least, for Bleek. The theory of a composite origin of the work has in a variety of forms come into very great prominence quite recently. Thus, according to the acute analysis of Volter in his singularly able and instructive work On the Origin of the Apocalypse (1882; new ed. 1885; compare the appendix to Simcox's Commentary), the original Apocalypse as written by the apostle in 65-66 A.D. consists of i. 6-iv. 1-7; iv. 1-10; vii. 8-14; viii. 1-ix. 21; xiv. 1-22; xv. 1-16; xvi. 17-xx. 11-16, xx. 17-xxii. 21. For this the apostle himself three years later (68-69 A.D.) added x. 1-xi. 13; xiv. 8; xvii. It received subsequent additions by other hands in the time of Trajan (xii, 16-22; xlii. xvi. 11, 12; xx.; xxi. 1-8), of Hadrian (v. 11-14; vii. 9-17; xlii.; xiv. 4, 6, 9-12; xv. 10-13-17, 19, 20) and two later A.D. and probably also from the Apostle Paul. From Pompey's capture of Jerusalem in 63 B.C. (x. 10, 2a, 8-11; xi. 1-13; xiv. 14-20; xvii. 3-4, 6, 8; xvi. 1-12, 17, 21; xvi. 1-6; xvii. 1-19; xx. 1, 2, 3a, 15) and from Caligula's time about 40 A.D. (vii., viii. 1-5; viii. 2-13 xix.; x. 16, 29-7; xi. 16, 19; xii. 1-14; xiii.; xiv. 13-16, 17-20; xix. 12-21; xx. 1-15; xxi. 1, 5, 6.) These three sections of the work correspond roughly, it will be seen, to the visions of the seals, the trumpets, and the vials. The work of reduction, Spitta holds, was completed of the 1st century. He finds the original number of the beast (616) in the name of Caligula (Gaius Caesar), and considers that it was only afterwards adapted to that of Nero (606). The treatises on the Revelation by Erbes (1891) and Schmids (1891) are in tendency similar, and treat the subject they deal with is still under active discussion: but it is already felt by all competent judges that the investigation thus inaugurated is likely to lead to valuable results, and ultimately perhaps may be found to afford an approximate solution of the problems connected with the Apocalypse, and so make it,
instead of being the obscurest, one of the clearest dogma is relative to the development of thought and feeling in primitive Christian times.

Literature.—For the text of the Apocalypse, which is more unsettled than that of any other New Testament book (the five uncial MSS. present the unusually large proportion of readings which are virtually unanimous), see 400 "The Apocalypses of the Dead Sea", 1879, by B. Weiss (ed. with critical notes [Leip. 1891], ought to be consulted. On the modern critical questions, besides the recent works of Völter, Spitta, and others already named, there are those of Reuss (1st ed. 1887), Weiss (2d ed. 1889; Eng. trans.), and Holtzmahn (Eng. 2d ed. 1886; also special introduction to his Handbook on Revelation, 1891). Of late works see also G. Rammel’s Apocalyptic Loci, 1862; English trans. 1878. Much useful information is given in G. D. Salmon’s Introduction to the Johannean Writings (1891); also in Farrar’s Early Days of Christianity (1892); Renan’s L’Antichrist (1873; Eng. trans.), and Chantrell’s L’Apocalypse et son Interprétation historique (1888). Of commentaries the most important or useful are those of Ewald (Lat., 1829), Lücke (1832), Weiss (Eng., 1846), Ewald (German, 1862; Eng. trans.), Renan (1868; Eng. trans. 1878), and Spitta (1889); this work being specially useful for the account it takes of the mass of current apocalyptic material which presumably was at the disposal of authors and early interpreters. The unfulfilled and unfulfilled prophecies of the Apocalypse have been very great; most of them until very recently wrote on the assumption that every one of these either has received or is to receive a full and complete fulfillment, though exact, and they can be classified according to their views of the manner of this realization. Those, for example, who, following the indication of Augustine, think that the denominations already come or even is already past, may fairly be called preterists. Of those to which mention is made, who identified Gog and Magog with the Turks in Europe, and Hengstenberg, who judged the man and beast already decided in 1837; on the other hand, who think that the kingdom, in any definite sense that can have been intended by the author, is yet to come, may equally just as be called "futurists," but they are of various degrees, some holding that none of the special preliminary events which are described as leading up to the millennium have as yet taken place; while others, sometimes referred to as the "elaborative," or, as they are designated in Spitta, have been characterized by the editor in these words, as "perhaps the most brilliant example," read into the book (with very wide divergences as to detail) what they consider to be the leading incidents in the political or ecclesiastical history of Europe in the last century; of the first description are most of the so-called "millennialist" writers; to the second belong the followers of Mede (1827). Apart from these definite schools, there is a mixed class of writers who are spiritualizing or idealizing or who were represented in ancient times by the Alexandrians, and whose method has often been found in modern times a convenient refuge for exegetical timidity or helplessness. Recent commentators with any character for sobriety to lose have, as a rule, been exceedingly cautious in dealing with the predictive element in the Apocalypse, some maintaining that its prophecies admit of a variety of fulfillments, but without attempting concrete interpretations of the past and still less definite forecasts of the future, by their light; while others go so far as to deny that the "peculiar element in the book," as it has been called, was from the very first intended to be read as a more or less imaginary picture of the kind of vicissitudes through which the church militant has passed and may be expected to pass before it reaches its final triumph. See Düsterdieck (in Meyer’s Commentary, 1859; new ed. 1887), Lee (in Speaker’s Commentary, 1881), Boyd Carpenter (in New Testament Commentary for English Readers, 2d ed. 1891), and in Expositor’s Bible, 1889), and Simcox (in Cambridge Bible for Schools and Colleges, 1880).

Revell, MASTER OF THE, the name of an officer, also called "Lord of Misrule," formerly attached to royal and other distinguished houses. It was his function to preside over the amusements of the court, or of the nobleman to whose house he was attached, during the Christmas holidays. The universities of Oxford and Cambridge and the Inns of Court had also their Lord Misrule. This officer became a permanent appendage to the English court in the reign of Henry VIII., and his duties included the keeping of the tents and pavilions which accompanied the sovereign on a royal progress, as also the keeping of the dresses and masks used in entertainments in the court, and the providing of new ones when required. In Queen Elizabeth's time the Mastership of the Revels was divided into several distinct offices. The office practically fell into desuetude about the end of the 17th century. See Poos (Feast of); and Wotton (Christmas). 

Revenue. The public revenue of the civilised states of the world is in every case treated of in the articles on the several countries in the section dealing with finance; thus, the various elements of the British revenue at different periods, as compared with the expenditure, is somewhat fully given at GREAT BRITAIN, Part. II. of the volume, p. 376. The inland revenue is distinguished from the Customs Duties (q. v.), and includes (1) the Excise (q. v.), comprising alcohol duty, liquor and luxury licenses; (2) Stamps, with the "death duties," probate, account, legacy, and succession duty; (3) Taxes on property, as real estate and personal property tax, land tax, and succession duty (see TAXES). The right of the Commons to regulate taxation and the onus of the national income is treated at PARLIAMENT, Vol. VII. p. 774. Below is a comparative table of the gross revenue of the principal civilised states for the years 1888 and 1890:

<table>
<thead>
<tr>
<th>Country</th>
<th>Revenue (1888)</th>
<th>Revenue (1890)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>£123,424,000</td>
<td>£240,010,000</td>
</tr>
<tr>
<td>Russia</td>
<td>9,757,000</td>
<td>8,505,000</td>
</tr>
<tr>
<td>Austria-Hungary</td>
<td>8,894,000</td>
<td>8,692,000</td>
</tr>
<tr>
<td>Germany</td>
<td>13,851,000</td>
<td>15,380,000</td>
</tr>
<tr>
<td>Sweden</td>
<td>4,340,000</td>
<td>4,036,000</td>
</tr>
<tr>
<td>Victoria</td>
<td>28,676,081</td>
<td>25,166,000</td>
</tr>
<tr>
<td>Britain</td>
<td>56,166,000</td>
<td>56,166,000</td>
</tr>
</tbody>
</table>

The revenue of Canada is £7,970,000; Cape Colony, £4,340,000; New South Wales, £3,063,397; Victoria, £2,676,081; British India, £561,000. In 1890–96 the revenue of Great Britain exceeded £100,000,000; in 1893–96 it was £105,614,000, besides £28,000,000 from local taxation; and with that of all the dependencies was well over £200,000,000.

For Revenue Officers, see COASTGUARD.

Reverberatory Furnace, a furnace so constructed that ores and other materials may be heated in it without coming in direct contact with the fuel. It consists essentially of three parts—vizz. a fireplace at one end; in the middle a flat bed to be heated is placed; and at the other end a chimney to create a draught and to carry off the smoke or fume. Between the fireplace and the bed a fire-bridge is placed, and the whole built over with a flat arch, dipping towards the chimney. The flame plays over the fire-bridge, and the heat is reflected, or reverberated, on the material beneath; hence the name. See COPPER, LEAD, and IRON (furnace building).
was stopped, but a companion succeeded in reaching Concord. During the war he rose to lieutenant-colonel; and after his return due to the goldsmith's work, and in 1801 founded the Revere Copper Company at Canton, Massachusetts. He died 10th May 1818. His ride is the subject of a well-known poem by Longfellow.

Reverend (Lat. reverendus, to be respected), a title of respect given to the clergy. In the Anglican Church deans are 'Very Reverend,' bishops, 'Right Reverend'; and archbishops, 'Most Reverend.' In Scotland, the clergy in general are 'Reverend,' while it is the practice to apply 'Very Reverend' to the moderator of the General Assembly for the time being, and to the principal of a university, being a clergyman. The style Reverend is generally adopted by and given to the clergy of the different dissenting bodies; and in 1876 the Privy-council decided on appeal that there is no law restricting it to ministers of the Church of England. There have, however, been instances in which some dissenting ministers have repudiated it. See ADDRESS (FORMS OF).

Reversion is the right to the enjoyment of money, or of any kind of property, postponed until or contingent on the happening of a given event. Reversions are usually divided into three classes: Absolute Reversion, in which the emergence of the rights is certain, Contingent Reversion, and Reversionary Life Interests. In the first case, when the reversionary interest is a fixed one, the value of the reversion is dependent merely upon the operations of interest (see INTEREST). When the date of the emergence of the reversionary right is uncertain, the purchase in an individual case must always be a speculation; but if there are a sufficient number of such rights, postponed to events of which there are sufficient observations from which to deduce laws of average, then the marketable value is easily calculated. For example, it is requisite to know what is the immediate value of £100 payable certainly on the death of a man aged sixty. Here the value of the reversion is £100, under deduction of the prior life interest, which in this case is the present value of annuity equal to the interest of £100 on the life of a man aged sixty. When an assurance company buys a reversion, it is simply buying that which it sells when it grants the right of life interest to its former case, however, an office, to secure its expenses and profits, will assume a high rate of interest and a long life; in the latter case, for the same reason, it will assume a low rate and a short life. By the Sale of Reversions Act, 1867, no purchase of a reversion is challengeable on the ground of undervalue merely. Where the reversion is contingent, problems arise whose solution requires the utmost skill on the part of the actuary. For instance, if, aged thirty, wishes to borrow £100 on the security of a sum payable to him in the event of his surviving his father until the latter shall be sixty, the security being doubtful, it could only be rendered marketable by assuring a sum to be paid in the event of B dying before A; and there would remain the important question of what this sum should be. It may cover the loan and the premiums of assurance with interest at 5%, but the value of the reversionary life interest is found by deducting the value of a joint life annuity from the value of the annuity on the life of the survivor (see the Institute of Actuaries' text-book, part ii.). Reversion is that right to property which remains after some particular term of years, which had been granted by the owner. Thus, if A has a lease estate in B's property, and after he dies the property returns to H, H is said to have the reversion or to be the reversioner. The landlord of property let to a tenant is called the reversioner, because the tenant only holds the use: the owner, or reversioner, the interest in the property and possessions vested in him. In Scots law reversion means the right of redemption retained by a borrower over an estate disposed in security.

Reversion, a term used to describe the tendency of animals and plants to show characteristics of some persistent past form. This is most prominently transverse bars on the legs and shoulders, and a blue pigeon like the wild rock-dove (Columba livia) sometimes appears even in a perfectly pure breed. See ATAVISM, and DEGENERATION.

Review. See PERIODICALS.

Revilina-Gigedo, a rocky and uninhabited island group in the Pacific, 400 miles west of the coast of Mexico, to which it belongs. The largest of the islets is 20 miles long.

Rivéville, Albert, a French Protestant theologian, was born at Dieppe, November 4, 1826, studied at Geneva and Strasbourg, and was pastor of the Walloon Church at Rotterdam in 1851–72. Then he lived near Dieppe until his call in 1880 to the chair of the History of Religions in the College of France.

His numerous books include Manuel d'Histoire comparée de la chrétienté et de la tradition juive (Scholten, 1859; Eng. trans. 1861); De la Redemption (1860); Essai de Critique Religieuse (1860); Manuel d'Instruction Religieuse (1863); Histoire du Pape de la Divinité de Jesus Christ (1869; Eng. trans. 1870); Protogénèses de L'Histoire des Religions (1881; Eng. trans. 1884); The Native Religions of Mexico and Peru (the Hibbert Lectures for 1884); Les Religions des Peuples Non-civilisés (1889); and La Religion Chinoise (1889).

Revising Barrister. See BARRISTER.

Revival, or REVIVAL OF RELIGION, a term employed to denote an increase of faith and piety in individual Christians, particularly after a period of religious declension, and also an increase of religion in a community or neighbourhood, both through the revival of those who are already religious, and through the conversion of the previously irreligious. Such religious movements frequently extend, more or less generally, over a neighbourhood, or sometimes over a country. Instances of a similar kind are recorded in the Scriptures as occurring both in the history of the Old Testament and in the early history of the Christian church, particularly in the effusion of the Holy Spirit on the day of Pentecost, and afterwards in connection with the ministry of the apostles, when many were converted through a single discourse, or, in other cases, evidently within a short time. In the middle ages revivals took place in connection with the Crusades and under the auspices of the monastic orders (see CHURCH HISTORY); and sometimes with repulsive adjuncts, as in the case of the Flagellants (q.v.) and the Dancing Mania (q.v.). The Reformation of the 16th century, and the more partial movements of the 17th and 18th centuries, were also regarded as essentially revivals of religion—the Reformation itself the greatest which has taken place since the apostolic age. In Scotland there were notable "works" in 1625 at Irvine and Stew- arton, in 1630 at Kirk-of-Shotts, and in 1638 at the Hebrides. The whole movement of the kind was that in the first half of the 18th century from which the Methodist churches originated. It was accompanied with many circumstances similar to those which have attended later revivals of religion. The movement began to be commonly employed till after this period; and the revival which took place in New England and other parts of North America about the same time under Edwards, Bellamy, and the
Tentsmen was generally designated the Great Awakening. The beginning of this revival seems to have had no connection with the Methodist movement in England, although subsequently they became connected through Whitefield's visits to North America. There were revivals at Cambridge in 1742 and among the Quakers in 1728.

A very extensive revival in Wales resulted in the formation of the Welsh Calvinistic Methodist Church, but was not confined in its effects to those who became connected with that church. Local revivals also in some instances attended the ministrations of Evangelists, and in the latter part of the 18th century in America. There were revivals in 1796, in 1812-15, and again in 1827-32. In 1839 the attention of all Scotland was drawn to a religious movement at Kilsyth, originating in the preaching of Mr. Porter, that was not generally attended with scenes of great excitement; strong but calm religious feeling was its general characteristic. It spread all over the United States, and it was believed that in a single year half a million converts were received into the religion professed. The revival extended to Ireland, and rapidly extended over the whole north, and subsequently to Scotland, Wales, and some parts of England. As a rule it was free from excitement, and characterised by little else than the intensity of religious feeling displayed.

Another remarkable revival, which extended over the greater part of Great Britain in 1874-75, originated in the efforts of two American evangelists, Messrs Moody and Sankey, and was characterised by the almost entire absence of sensationalism. The Salvation Army carries on its work largely by methods known as revivals. Revivals of religion have occurred also in other parts of the world. Though evangelical Christians generally recognise revivals as in the main divine works of grace, they agree in deploiring the extravagances and the sensationalism that have not unfrequently accompanied them and done grievous harm to the cause of religion.

See Fleming's "Fulfilment of the Scripture" (1861); Edwards, "The Work of God in New-England and New-Britain" (1746); Bobe's Narrative (1742); Pringle, "Surprising Accounts of the Revivals of Religion in the United States" (1802); lectures on the subject by Sprague (1833) and Finney (1833); Mrs Landis' "History of Revivals of Religion in the British Isles" (1840); Linley, "Handbook of Revivals" (1874); Porter, "Revivals of Religion" (1877); Overton's "Evangelical Revival of the 19th Century" (1886); and the journals and biographies of the Wesley's, Whitefield, the Haldanes, and other eminent evangelists.

**Revival of Learning.** See Renaissance.

**Revolution**, any extensive change in the constitution of a country, suddenly brought about. The most important events in modern history specifically known under this name are the English revolution of 1649 (Guzin by 'Revolution' means the 'Great Rebellion'); the American revolution of 1776; the French revolution of 1789; the English revolution of 1688; the French revolution of 1789; the American revolution of 1812, which terminated in a peace unoffensive and unprofitable; the French revolution of 1830, which deposited Charles X. and raised Louis-Philippe to power; the revolution of 1848 ('the revolution of February'), which established the second republic; and the revolutions by which the existing South American republics (forty out of fifty in 1809, and of Chili in 1819) were established or were from time to time modified. The revolutionary period per excellence is the years 1848 and 1849. The French change of constitution in 1871 is not usually spoken of as a revolution, though in effect it was one. For the Revolutionary Tribunal, see Danton.

**Revolver**, in Firearms, is a weapon having barrels or chambers which revolve upon a common centre, and are fired in turn by one lock mechanism. Revolving firearms date from the century into line; with the revolver Lock-Hammers, having two or more barrels were mounted to turn upon an axis, and so arranged that the powder-pans came successively under the action of the lock; the barrels were not rotated by pulling the trigger, but were turned by the hand. The celebrated Marquess of Granby received several such. In 1815 Le Norman, a Parisian gunsmith, produced a pistol with five barrels, Devisme one with seven, but neither proved successful. The 'Mariette,' made with from four to twenty-four barrels, was the first to become popular, although from its weight, cumbersome mechanism, and short range, it could have been of little use except at close quarters. This pistol was the precursor of the 'pepper-box' pistol, to which it was closely allied; the barrels of both were bored in a solid mass of metal, and made to revolve as the hammer was raised to full cock. Not so old as the principle of revolving barrels, but still an invention of past generations, is that of a revolving chamber or breech-piece, pierced with cylindrical apertures to contain the charges, and so arranged that each chamber came successively into line with the barrel and lock common to all. E. H. Collier in 1818 patented an improved carbine with three revolving chambers, which appears to have been an efficient weapon. Colonel Samuel Colt produced his world-renowned revolver in 1835. This consists of a rifled barrel, a revolving cylinder with six or seven chambers, each furnished with its own nipple and cap, and a lever trigger, which operates the mechanism required to turn the chambers and fire the weapon. The double-action revolver, is one in which by simply pulling the trigger the hammer is raised and released, and the chambers turned; whilst in the single-action revolver the hammer is raised by the thumb of the firer and released by the trigger.

Breech-loading revolvers are of two kinds — the solid frame revolver, which requires the empty cases to be forced out by a diminutive ramrod (generally attached to the pistol by a swivel), and the self-extracting revolver, of which there are many kinds. The regulation pistol of the British army is that illustrated here. By pressing the lever, e, the bolt securing the top of the hinged frame is released, and the barrel turning upon the hinge raises the chambers, whilst the extractor-rod coming into contact with a spur-lever, flips out the fired cases and returns into position; the chambers are thus exposed for loading, and upon the barrel being raised the breech-bolts snap home.
and the pistol is ready for firing by pulling the trigger. This principle is the most popular of any employed for self-extracting revolvers, and it has proved efficient. There are many types of revolvers, self-extracting and other, but, with the exception of cheap weapons and some single-action solid-frame revolvers popular in America, the principle adopted by many other models they now make one in which the hammer is covered, and the pistol can only be fired when firmly grasped by the hand, as a safety belt, which effectively and automatically bolts the firing mechanism, projects through the haft, and has to be pressed in before the trigger can be drawn back to raise the hammer and fire the weapon. This pistol is perfectly safe, and insures immunity from such accidents as arise from careless handling.

For military purposes the revolver is generally made of half-inch calibre, and such a weapon has a range of from 100 to 300 yards, whilst at 50 yards ten consecutive shots have been placed in a 4-inch bull's-eye. At shorter ranges its precision is equal, and to that of the finest duelling pistol. Revolving arms of large size are used as Cannon (q.v.) and Machine Guns (q.v.); and for further particulars of revolving arms see Fusil and Revolver (Boston, 1889); and British service publications.

**Revue des Deux Mondes**, the best known of the French magazines devoted to literature, art, and general criticism, was founded in Paris in 1831, by Francois Bulot. It had appeared during 1829, but was languishing until purchased by Bulot, who firmly established it. Many of the best French writers have contributed to its pages.

**Rewa**, a state of India, called also Baghel-khand (q.v.).—*Rewa Kantiha* is the name of a political agency under the government of Bombay, containing sixty-one small states, of which five are tributary to the British government, and most of the remainder to Baroda. The territory included, covering 4,792 square miles, with total population 5,434,452, lies mainly along the south bank of the lower Nerbudda with patches north of it, and on the west borders on Baroda, Baroda, and Ahmedabad.

**Reward**, in a legal sense, means some encouragement which the law holds out for exertions in bringing certain classes of criminals to justice. By statute 7 Geo. IV, chap. 64, the courts of assize may order the sheriff of the county, in which certain offences have been committed, to pay to persons who have been active in securing the apprehension of offenders charged with murder, or with feloniously shooting, cutting, stabbing, wounding, or wounding and inflicting grievous bodily harm, or with being accessory before the fact to any of such offences, or to receiving any stolen property, a reasonable sum to compensate them for expense, exertion, and loss of time. So by a later statute (14 and 15 Viet, chap. 55) courts of quarter sessions are authorised, in the case of any of the above offences which they have jurisdiction to try, to order such compensation; but the payment to one person must not exceed £5. If any one is killed in endeavouring to apprehend a person charged with one of these offences, the court may order compensation to be made to the family. The amount to be paid in all such cases is subject to regulations which may be made from time to time by the Secretary of State. By statute (24 and 25 Viet, chap. 96) it is a felony, punishable by penal servitude to the extent of seven years, to corruptly take any reward for helping a person to property stolen or embezzled, unless all due diligence be brought to the offenders to trial has been used. In Britain an advertisement offering a reward for the return of stolen or lost property, using words purporting to make such questions will be tantamount to the person producing the property, renders the advertiser, printer, and publisher liable to forfeit £50. For several years the offering of rewards by the government has in England been discontinued on grounds of public policy. For example, during the series of murders in Whitechapel in 1888-90, the Home Office, though urgently requested to offer a reward for the discovery of the criminal, steadily refused to do so.

**Rewari**, a town of the district of Gurgaon, in the extreme south of the Punjab, 50 miles SW. of Delhi by rail, an important centre for trade between Punjab and Rajputana. Pop. 29,900.

**Reyband**, Marie Roch Louis, a clever French writer, was born at Marseilles, 15th August 1799, travelled in the Levant and India, and returned to Paris in 1829 to write for the Radical papers and edit the Histoire scientifique et militaire de l'Expédition Française en Egypte (10 vols. 1830-36), Dumont d'Urville's Voyage autour du Monde (1837); Voyages d'Orléansy aux Amériques (1836). His studies in social science bore fruit as Études sur les Réformateurs ou Socialistes modernes (2 vols. 1840-43; 7th ed. 1864), which gained him the Montyon prize (1841) and a place in the Academy of Moral Sciences (1850). His unusually original satire novel, D'Après Patouret à la recherche d'une Place sociale (1843), became widely popular, and was followed by the less successful Jérôme Patouret à la recherche de la meilleure des Républiques (1848). Reyband took an active part in politics, first voted with the Left, but after the July revolution with the Right, and was sent by the Assembly to Algeria to visit the agricultural colonies established there. His last thirty years were devoted to studies in economics. From 1890 a member of the Academy, he died at Paris 28th October 1879. Among his later works were Croquis et recueils de voyages (1854), La France modern (1855), L'Industrie en Europe (1856), and Études sur le Régime des Manufactures (1859).


**Reynard the Fox**, a well-known popular epic the characters of which are animals instead of men. It belongs to the series of Beast-fables (q.v.) which have delighted the popular imagination from early ages and in all lands, from the Middle Ages to the Bushmen's country in South Africa (see FABLE). The stories that relate the knaveries of Reynard the Fox seem to have originated for the most part in northern France and Flanders from the 16th century onwards, and have been composed in many languages, particularly in various forms in the 12th and following centuries. The authors or editors, so far as they are known, belonged chiefly to the ecclesiastical orders. The several versions differ not only in respect of language and of style, but also in the choice and arrangement of the episodes and incidents narrated. All turn upon the knaveries of Reynard the Fox, as practised by him in his quarrel with Isengrim the Wolf, who in all encounters generally comes off second best. The best versions, as the typical French, are L'Enlèvement d'Infant (in detail lower down), reach a high level of literary excellence. The episodes are woven together into a veritable epic; the versification is agreeable and easy; the characters are consistent and well-sustained; the contemporary manners, and the localities and circumstances, that make the background of
the story are true and realistic; and the story is told without any other obvious purpose beyond that of affording honest amusement. These features do not, however, characterise all the versions: some have been critically written in French, but there are loosely-connected strings of ill-told adventures, others drag out a long and weary length through innumerable indifferent verses, whilst in others still the characters are simply men disguised as animals. The earliest version (1284) in Latin, but it seems to have been soon supplanted by French in the 12th century, and in their new dress the stories attained a much wider popularity. Since the beginning of the 16th century nearly all the editions printed can be traced back to one of two sources, a Flemish or a Low German, both of which, however, are based upon French forms of the epic. The task of tracing the connections between the numerous versions that exist in the different tongues is one of great complexity and difficulty. It will suffice in this place to enumerate the more important, with mention of one or more trust-worthv recent editions. The best Latin version, Isengrimus (ed. by Meon as Reinardus Vulpes, Stuttgart, 1832; and by Voigt, Halle, 1884), which possesses considerable literary merit, was written in Flanders about 1146-48 by an unknown author. The first German translation in Reinhardissen's Reinhart Fuchs (Berlin, 1834) is not an older, but a later and abbreviated, form of the same poem. The best French versions that survive were edited by Meon (4 vols. Paris, 1825), with a supplement by Chatelain (1835) and by Martin (4 vols. Strassburg, 1882-88). They were written between the middle of the 13th and the middle of the 14th century, and run to enormous length, the separate cycles or groupings of the episodes being called 'branches.' Meon's work includes three cycles: (1) Roman du Reynard, (2) Roman du Lion, and (3) Roman du Loup. Of not unconsidered authors, Pierre de St Cloud, a priest of Laerocix in Brie, and a Norman priest Robert de Lison; (2) Le Conoumement de Renart, attributed to Marie de France; and (3) Renart le Noueud, by Jaques Marin Glicée de Lille, about 1290. The last two are transcriptions in upon certain of the monastic orders. There is a fourth cycle, a voluminous compilation or imitation by a priest of the neighbourhood of Troyes, made near the middle of the 14th century, and entitled Le Renart Contréfait (ed. Reinhardissen, 1858), in High German version, Reinhart Vaehs oder Fuchs (ed. Reisenerberger, Halle, 1886), more usually called Reineke Fuchs, was adapted by some one unknown, early in the 13th century, from a still older version, Isengrimes Not, itself a translation made from old French sources about 1180 by an Alsatian, Heinrich der Glichesae. The Flemish version which has been the basis of most of the translations, continuations, and editions that have been made since the invention of printing is entitled Reynart de Fos (ed. Martin, Paderborn, 1731), written by William de Matoc, William Uttenhove, or more probably an unknown William, is uncertain, and dates apparently from the middle of the 13th century. The source upon which it is built is the nineteenth 'branch' of the French version in vol. i. of Meon). The text that has been almost exclusively used in the later translations, &c., is that of a second edition, deviating in some respects from William's own, notably in the infusion of a didactic, satirical tendency; the author of this second edition has been called William, but it is more likely to have been Simon de Cola, a relative of William (see ed. Reinhardissen, 1858). This second edition, published at Gouda in 1479, that Caxton made his translation of The History of Reynard the Fox (1481; reprinted Edin. 1884). Upon this same edition was based the Low German version, Reineke de Vos (ed. PrieN, Halla, 1887), which has been more often translated perhaps than any other version. Who the Low German translator was is not known, in spite of the question having greatly exercised many specialists. The adulatory preface of Rotstok (1498), and next to it stands that of Brestock (1517). There are Danish (by A. H. Weigere, Lübeck, 1555), Swedish (Stockholm, 1621), and several other High and Low German translations. A more recent one was contained in Simrock's Deutsche Volksbücher (vol. i. 1845) and Marbach's Volksbücher (vols. xv.-xvii.).

The outline of the story, according to the Flemish Reinwart, is as follows: Noble the Lion, king of animals, was holding court one Easter-tide. All the animals, great and small, came and paid homage to him except Reynard the Fox. Several amongst them complained of the knaves of Reinart, the lowest being Isengrim the Wolf, Reynard's old comrade and enemy. He was followed to the house of the Fox, but Grin- bart the Badger spoke up for his uncle. Then came Chanticleer the Cock, bringing his dead daughter slain by Reynard. For this and his other misdeeds the Fox shall not be resolved, but is to appear before the Lion and be tried. In the meantime the Fox, who had been reprieved, received him with soft words, told him of some honey hidden in a split tree, and contrived to get Bruin caught fast in the cleft of the tree; there the peasants found him and nearly beat him to death, but at last he got away and went back to court. The Lion sentenced him to death, and sent him to be hanged on a gallows. The Cat, however, persuaded him to catch mice in a place where a noose hung, in which the Cat got caught; and he too was terribly beaten before he got away. At last Grinbart the Badger offered to undertake the office of messenger; and he persuaded Reynard to go with him. On the way the Fox makes a sort of private confession of his rascality and misdeeds to his relative the Badger, especially of the tricks he has played off upon the Wolf. The animals again came forward with their demands, and again the Wolf was condemned to death. As he was about to be hanged on the gallows, he begged leave to make a public confession of his evil deeds. In the course of his speech he dropped a hint that he knew where an immense treasure was hidden, and then, at the Lion's request, tells all about it. His father, old Reynard, and Isengrim the Wolf, and Bruin the Bear had conspired together to slay the Lion and make Bruin king in his stead; but his (Reynard) had stolen their treasure, with which they thought to hire soldiers, and had gone and hidden it. He would not tell them where he had it, and wished Bruin and the wicked Bear to be made king in his place. The Lion thereupon pardoned him, and caused Bruin and Isengrim to be seized and evilly entreated. But when he asked Reynard to go and show him where the treasure was, he refused to do so, saying he was under an oath to make a pilgrimage to Rome. The Lion then let him go; and Reynard, taking with him Cuaerten de Hare and Belin the Ram, set out on his pilgrimage. On the way he passed his own home, and induced Cuaerten to go into the house with him, and there killed him, that he might put his head in a satchel (made from the skin of the Bear) and give it to Belin, and bade him carry it back to the Lion, telling him it contained valuable letters. When the Lion saw Cuaerten's head he was exceeding wroth, and bade them let the Wolf
and the Bear go free out of prison; and he gave the Ram into their power, and decreed Reynard to be an outlaw.

To this the Low German version adds a continuation, partly a repetition of the same incidents under a different name, which is partly a local variation of the story, ending in a single combat between the Fox and the Wolf, in which the former by trickery beat his antagonist. Finally he returned to his own home, honoured with the favour and protection of the Lion.

For further details consult the Introduction to W. J. Thoms' edition of Caxton's Reynard (1845), Carlyle's "Carlyle's Miscellaneous Essays" (not quite accurate), and F. S. Ellis' "History of Reynard the Fox" (1894). See also L. S. Reynolds, "Reynard in the German" (1898).

**Reynolds, John Falton**, an American general, was born in Lancaster, Pennsylvania, 20th September 1830, graduated at West Point in 1841, and became commandant there in 1839. As brigadier-general he fought at Mechanicsville and Gaines's Mills, and was taken prisoner at Glendale, but escaped in August after the battle of Bull Run his own bravery induced his brigade to stand fast, and so prevented a complete rout. In November he was commissioned major-general, and in 1863 commanded a corps at Fredericksburg. He was killed at Gettysburg, while returning from the battle of the James River on 18th June 1863. The state erected a granite shaft on the spot where he fell, and his men a bronze heroic statue on the field; and in 1884 an equestrian statue was unveiled in Philadelphia.

**Reynolds, Sir Joshua, P.R.A.,** portrait and subject painter, was born at Plympton Zareh, Devon, on 16th July 1723, the year of Kneller's death. His father, a clergyman and master of Plympton grammar-school, intended him for the medical profession; but he developed a strong aptitude for painting, was continually studying the plates in Cate's "Book of Emblems," Dryden's "Plutarch," and the other volumes that came in his way, and at the age of eight had mastered the "Jesuit's Perspective," and applied its principles to drawings executed by himself. In October 1740, accordingly, he was sent to London to study art, and accordingly managed, although he was but a portrait-painter, of very moderate abilities, much employed at the time. In 1743 he returned to Devonshire, and some of the portraits of local worthies which he then produced still exist. In the following year he was again in London pursuing the same studies. In 1747, after the death of his father, he settled in Plympton Dock, now Devonport, where he learned much from a study of the works of William Gandy of Exeter. In 1749 he made the acquaintance of Commodore, afterwards Lord Keppel, who invited him to accompany him on a cruise in the Mediterranean; and, after painting many of the British officers in Minorca, he made his way to Rome, where he studied Raphael and Michael Angelo, and in the Vatican caught a chill which permanently affected his hearing, and necessitated his use of an ear-trumpet during the rest of his life. He also visited Bologna, Genoa, Florence, Parma, and Venice. Returning to England in October 1752, he soon afterwards established himself in a studio in St Martin's Lane, London, and attracted notice by his portraits of the second Duke of Devonshire and Caroline, Duchess of Brunswick. Before he was in excellent practice, and in the year 1755 he had no fewer than a hundred and twenty sitters, of whom he produced portraits in which the influence of the Italian masters, and especially of Correggio, is clearly visible; works in which he was certainly aided by such assistants as March, but which he impressed with his own character and individuality.

He soon removed to Great Newport Street; and finally, in 1769, he purchased a mansion on the west side of Leicester Square, to which he added a studio and reception-room.

He was popular at the height of his fame, and a valued member of many celebrated contemporaries. In 1764 he founded the famous literary club of which Dr Johnson, Garrick, Burke, Goldsmith, Boswell, and Sheridan were members; all of whom were portrayed by his brush. He was one of the earliest members of the Incorporated Society of Artists, and contributed to "The Portraits" in 1768, when, on the establishment of the Royal Academy, he was elected its first president; and in the following year he received the honour of knighthood from the king. In 1769 he delivered the first of his Discourses to the Royal Academy, fifteen of which have been published. They are full of valuable and well-considered instruction, and, along with his papers on art in the "Idler," his annotations to Dr Froude's "Art of Painting," and his Notes on the Art of the Low Countries (the result of a visit to the Low Countries in 1781), show a correct and cultivated literary style. He contributed his picture of Miss Morris as 'Hope nursing Love' to the first exhibition of the Royal Academy, along with his portraits of the Duchess of Manchester, Mrs Blake, Mrs Crewe, and Mrs Sowerby; and in 1786, "Count Ugolino and his Children in the Dungeon," usually regarded as his most successful effort in the direction of historical art. In 1784 he succeeded Allan Ramsay as painter to the king; in the same year he finished and exhibited his portrait of Mrs Siddons as the 'Tragic Muse,' in the possession of the Duke of Westminster, undoubtedly his greatest portrait, a work existing in several versions, of which one is in the Dulwich Gallery; and in 1787 he undertook three subjects for Boydell's Shakespeare Gallery, executing 'Puck,' 'The Witch Scene from Macbeth,' and 'The Death of Cardinal Beaufort.'

Hitherto he had devoted himself with little interruption to his art, having speedily recovered from a slight attack of paralysis from which he suffered in 1782; but in July 1789 his sight became extremely bad, and he endeavoured to make an effort; but he was still able to enjoy intercourse with his friends. The following year was embittered by an unfortunate dispute with the Academy regarding the appointment of a professor of Perspective, which led to his resignation of the presidency, and the resolution of his friends to have him re-elected; and on the 10th of December 1790 he delivered his last Discourse to the students. Gradually his strength sank—for, unknown to his physicians, he was suffering from a painful form of liver complaint—and he peacefully expired on the 29th February 1792.

It is in virtue of his portraits that Reynolds ranks as the head of the English school of art. In the dignity of their style, the power and expressiveness of their handling, the variety and appropriateness of their attitudes, in the beauty of their colouring and the delicacy of their flesh-painting, his portraits have never been surpassed. He was at home alike in portraying the strength of manhood and the grace of the gentle sex; and his pictures of children have an especial tenderness and beauty which have given a world-wide celebrity to "Kate the Strawberry Girl," and "Simplicity." His efforts in the higher departments of historical and imaginative art were less successful, and too often these can be regarded only as among the failures of a great artist. In his technical methods Reynolds was unfortunately most careless and uncertain. He was continually experimenting in new processes
and untied combinations of pigments, with the result that even in his own lifetime his works deteriorated, especially in their flesh-tints. Persons of RHAMPSINITUS which 1813 pigments, them—37), with related title R.a a them—Ramses, 'which but as

The building of Sir John Dixon, William Dickinson, Valentine Green, and James M'Arroll—ranking among the finest examples of the art.


Rhabdomancy. See Divination, Divining Rod.

Rhadamantus, in Greek Mythology, the son of Zeus and Europa, and brother of Minos of Crete. He settled in Boeotia, where he married Alcmene. So great was his reputation during life for the exercise of justice that after death he was appointed a judge in the under-world, along with Minos and Aeacus.

Rhedia, an ancient Roman province embracing a large part of the Alpine tract between the basins of the Po and the Danube, now included in the Grisons and the Austrian Tyrol. Its inhabitants were brave and turbulent, and were only subdued by Drusus and Tiberius after a desperate resistance. The province was then formed, to which Vindelicia was soon added; but later Rhedia was subdivided into Rhedia Prima and Rhedia Secunda (Vindelicia). The only important town in Rhedia was Tridinium (Trident); the colony of Augusta Vindelicorum (Augsburg) was in its northern part.

For Rhetic Beds, see Triassic System.

Rhannaceae (Buckthorns), a natural order of exogenous plants, consisting of trees or shrubs; often spiny; with simple, generally alternate leaves, and stipules minute or wanting. This order contains about 250 known species, natives of temperate and tropical countries, and very generally distributed over the globe. The prevailing principle in the buckthorns is a bitter extractive which is acrid or astrigent, tonic and anti-fibrile. Some of them are used in dyeing (see Brenchley, French Berries), some in medicine (see Red Root), and the fruit of some is pleasant (see Jujube); whilst Hovenia dulcis, a native of China and Japan, is remarkable for the thickening of its flower-stalks after flowering, so as to form a succulent sweet red pulp, with a

flavour resembling that of a pear. The lotus of the ancient Lotusphagi, celebrated by Homer, is the fruit of Zizyphus lotus, a small shrub abundant in Spain, Sicily, Barbary, Tunis, and parts of the African coast.

The wood of Rhoeo ensiformis yields a superior charcoal for the manufacture of gunpowder.

Rhampsinitus, a Grecised form of the Egyptian name Ramses, apparently Ramses III., the builder of the pavilion of Medinet Abu at Thebes. Bruges makes Rhampsinitus a Greek form of Ramessiacum, a title given by Ramses III. to Ramesses-ai-nil (‘Ramses, son of Neith’), a title never borne by the Theban kings, but first used by the Saite princes, which fixes the date of the tale to the period of Psammethichus and his dynasty. Of him Herodotus (II., 121 et seq.) relates a story substantially the same as one of the most widespread folk-tales of the Aryan world. The king acquired an enormous treasure, and to secure it built a treasury of stone. The architect left one stone loose, so nicely adjusted as to be unnoticed, yet enabling it to remain in place without difficulty. Before death he entrusts the secret to his two sons, who from time to time plunder the king’s treasure at their will, until at length the elder is caught in a snare set by the king. According to his desire, the younger brother cuts off and carries away the stone, so that the treasury is known. The king now orders the heedless body to be exposed unburied, protected by a guard of soldiers, but the younger brother lades an ass with skins of wine, allows some of it to run out, and is relieved in his distress by the soldiers, to whom in gratitude he gives his ass. So freely that they all sink into a drunken sleep. Thereupon he shaves the right half of all their beards, and carries his brother’s body to his mother. The king next sends his daughter to find out the clever thief. She promises her love to the one who reveals to her the most extraordinary things that have ever happened to them, and when the young man in his turn relates the strange passages of his life she seizes him; but he cunningly slips his brother’s dead hand into hers, and so escapes. The king is so much struck with wonder and admiration that he promises the clever thief his daughter in marriage, since he surpassed all mankind in knowledge; for, while the Egyptians surpassed all the world, he surpassed the Egyptians.

Such is the oldest recorded version of Asbjörnsen’s ‘Master-thief’ and Campbell’s ‘Shifty lad,’ Dr Barbu Constantinsson’s Romanian gypsy story of ‘The Two Thieves,’ a variant of the story of Trophonios and Agamedes in the treasury of Hyrieus at Hyria (Paus. ix. 37), of Angelines in Ellis, and of Hermes (φρούς φλαγγών), as well as of the Hindu legend of Kārpara and Gata, or that of Ali Baba and the Forty Thieves in the Arabian Nights. The story occurs in the oldest version (12th century) of the romance of the Seven Wise Masters, the Dopanothis, sive de Rege et Sepulchro, translated into Latin which Sophia of Brunswick derived the story as found in his Pecorone (written circa 1378), where it is related of an architect named Bindo who stole a golden vase from the treasury of the Doge of Venice. It will be found, more or less perfect, in every collection of European folk-tales, German, French, Breton, Albanian, Sicilian, Hungarian, Dutch, Tyrolese, Danish, or Russian, as well as Kabiyl, Mongolian, Tibetan, and Sinhalese.

Maspero defends the story as fundamentally Egyptian. His account is the version of Herodotus, in spite of the Greek dress in which the historian has clothed it. It has been objected by some that the idea of a movable stone is not Egyptian, and is but ill adapted to the size of the stones used in building; but at Dendera have
been found a series of crypts communicating with the temple by narrow passages formerly opened and closed in a similar manner, the stone sculpturing of this half-shrubby plant is in keeping with the view that the temple was adorned with plants. Wilkinson objected that the soldiers wore no bears; but his relief and statues show that Egyptians of pure race wore bears according to individual taste; and besides the soldiers of police in question belonged to a tribe of Libyan origin, named Mazion, whose natural emblem was the bear.

See Liebrecht's translation (1851) of Dunlop's History of Free Fiction; A. Schieffer in vol. xiv. of the Bulletin of the St Petersburg Academy of Sciences; W. A. Clouston's Popular Tales and Fictions (1887); and Manuscript de Contes Populaires de l'Egypte Ancienne (2d ed. 1889).

**Rhapsodists** (Gr., from ῥαψαίνειν, 'to stitch together,' and ὄδὲ, 'an ode'), a class of men in ancient Greece who travelled from place to place reciting poetry. They are distinct from the professional minstrels (nautaës) of the Odyssey, although their legitimate successors; but they also seem, at first at least, to have been composers of epic poetry, although it is hardly probable that this was often the case after the 6th century B.C. We find distinct traces of the public recitation by rhapsodists of the Homeric poems at an early date, as at places so far apart as Sicyon, Symecon, Delos, Chios, Cyprus, and Athens. Indeed at Athens ancient law prescribed the recitation of Homer once every four years at the festival of the Great Panathenae. To the early rhapsodists mainly belongs the credit of the wide diffusion of the Homeric poems throughout the Greek world. They themselves were held in high esteem and richly rewarded; but in later days the art came to be practised in a mere mechanical manner, and the influence of the rhapsodists ebbed accordingly. In Plato's Ion we get a picture of the rhapsodist at his work about the middle of the 4th century B.C. Ion is a native of Ephesus who goes from city to city reciting Homer to crowds of hearers, appearing on a platform in a richly-embroidered dress, a golden wreath on his head. He adds dramatic force to his declamation, and brings Homer home to his hearers' hearts, being himself possessed by Homer. Moreover, he interprets Homer in a continuous exposition, and is proud of his fluency of ideas. Ion is described as devoted exclusively to Homer, but there were a few of his bretheren who gave themselves also to a greater degree to Muses, Hermes, or Simonides. It is unlikely that Homer was ever sung to music, although in earlier times there were heroic lays which were sung to the accompaniment of the lyre. As lyric poetry became more distinctly cultivated, such epic lays came to be simply declaimed, the rhapsodist holding a branch of bay in his hand instead of a lyre.

**Rhatany**, or Rattany, a half-shrubby plant, of the natural order Polygala, a native of the cold sterile table-lands of the Andes in Peru and Bolivia. It is called Rhatanich in Peru. It is used in medicine as a stimulant property of the root which are shared more or less by other species of the same genus, also natives of South America. In the British Pharmacopoeia the dried roots of two species (Krameria triandra, Peruvian Rhatany, and K. zinja, Savannial Rhatany) are official and interchangeable. These roots have a good deal in size and thickness, but are always rough-looking, and reddish in colour. The bark has a strongly astringent taste, and when chewed tingles the saliva; the wood is nearly tasteless. The dried root is a powerful astringent, and is employed in the treatment of haemorrhages, partial haemorrhages, and cases where an astringent or styptic action is indicated. The finely-powdered root is also a frequent constituent of tooth-powders.

**Rhatany** root is imported from various parts of South America, but chiefly from Lima. It is extensively imported into Portugal in order to communicate a red colour to wines. Its peculiar properties are due to rhatany-tannic acid, found in the root-bark to the extent of 20 per cent.; it also contains a red colouring matter.

**Rheas**, or Râzî, Persian physician and alchemist. See Medicine (p. 367) and Arabia (p. 369).

**Rhé, l'ile de**. See Ré.

**Rhea**, an ancient Cretan earth-goddess, daughter of Uranus and Gaea, wife of her brother the Titan Cronus, and by him mother of the Olympian deities Zeus, Hades, Poseidon, Hera, Hestia, Demeter. She was early identified with the Asiatic nature-goddess Cybele, the Great Mother, who was worshipped on mountains in Mycia, Lydia, and Thrasyia. Her Cretan Curetes corresponded to the Phrygian Corybantes, many of whom imitated themselves like Attis in the frenzy of their orgies. The regular priests of Cybele, the Galli, made themselves eunuchs for conscience' sake. A Sibyl-line oracle decreed the introduction of the worship of the Great Mother at Rome in 264 B.C., and in 217 B.C. a temple was dedicated on the Aventine, and the cult became widely extended under the Empire. In the 21st century A.D. the rites of the Tarabollia and Criobolia were added, in which candidates were baptised for purification and regeneration with the blood of sacrificial bulls and rams. See the article CYBELE.—*Rhea Sylvia* was the mother of Romulus (q.v.).

**Rhea**, also called Nandi and American Ostrich, a genus of South American birds, which form, according to the most recent researches, a somewhat isolated group, though nearer to the ostriches than to any other birds. They are incapable of flight, and are as large as the ostrich, or larger, although generally smaller than in any other of the so-called 'Struthions' birds; they present an interesting austral character in the persistence of a claw upon each of the three digits, thus recalling very forcibly the origin of the wing from a prohensile forelimb. As in the ostrich and the apteryx, the feathers have no after-shaft, and the colour of the eggs is white. The male bird incubates. There are three distinct species—viz. *R. americana*, *R. macrorhyncha*, and *R. Darwinii*, which are to be distinguished by their geographical range as well as by external and internal features. A few of these birds inhabits the southern half of the continent. *R. macrorhyncha*, which is darker coloured, especially on the head, is found in north-east Brazil. *R. Darwinii*, in which most of the feathers have white tips, is found in south-eastern South America. They all prefer grassy plains (campos), herd in troops, and run with great rapidity.

**Rhea Fibre**. See BOHEMIA.

**Rhégium**. See REGGIO.

**Rheims**, or REIMS, a city in the French department of Marne, a site of the Roman town of Vesuz (a tributary of the Aisne), 100 miles ENE. of Paris by rail. Strongly fortified with detached forts since the Franco-German war, when it was for a time the German headquarters, it is well built, and from the material employed in building, which is the chalkstone of the region, rather better developed than in any other of the older style of domestic architecture, has a picturesque appearance. It is built on the site of Dorobvrorum, which is mentioned by Caesar as the capital of the Remi, from which people it subsequently took its present name. Christianity may have found an entrance in A.D. 50, and by 150 the province of the Olympic deities was not till about 390 that it became a bishop's see. Under the Frank rule it was a place of much importance, and it acquired a deeply religious
interest from its having been the scene in 496 of the baptism of Clovis and his chief officers by the bishop, St. Pirmin, and in 1443-1454, when Philip Augustus was solemnly crowned here, it became the place for the coronation of the kings of France, who were anointed from a vessel of sacred oil, called the Sancta Ampulla; which a dove was said to have carried from Remi from heaven. Joan of Arc brought the dauphin hither, and the only sovereigns in the long series, down to 1825, not crowned at Rheims were Henry IV., Napoleon I., and Louis XVIII. In 1793 the cathedral was attacked by the populace, and the sainte ampoule smashed by a sance-cloître; and in 1830 the ceremony of coronation at Rheims was abolished. The cathedral, although the towers of the original design are still unfinished, is one of the finest extant specimens of Gothic architecture. It was built between 1112 and 1490, and in 1177 the government voted 500,000 towards the restoration. Its nave is 466 feet long by 99 in breadth, with a transept of 160 feet, and the height is 144 feet. Its grandest features are the west façade, which is almost unrivalled, with its magnificent doorway (figured in Vol. I. p. 59), called Angel Tower, which rises 59 feet above the lofty roof. The stained glass is remarkable for its beauty; the organ is one of the finest in France; and two survive out of six magnificent tapestries. The Romanesque church of St. Remy (mainly 1160-80), with the saint’s shrine, is nearly of equal size, but of less architectural pretension. Also noteworthy are the hôtel-de-ville (1827-1880); the ancient ‘Maison des Musiciens’ and archiepiscopal palace; the Porta Martis, a Roman triumphal arch; the Lycées, representing a former university (1547-1793); and the statues of Louis XV. and two nates, Colbert and Marshal Ducrot. Rheims is one of the principal entrepôts for the wines of Champagne (q.v.), and the hills which surround the town are planted with vineyards. It is one of the great centres of the woollen manufacture in France, and its manufactures, embracing woollen goods (especially merinoes), mixed fabrics in silk and wool, &c., are known in commerce as Artiches de Rienz. Pop. (1872) 71,307; (1891) 101,699. See the article DOUAY; and Justinus, Rheims, la ville des sacrés (1800).

Rheingau, a district, 14 miles long, stretching along the right bank of the Rhine, from opposite Mainz to the village of Lorch, 8 miles below Bingen, formerly belonged to the archbishopric of Mainz, and now forms part of the administrative district of Wiesbaden in Prussia. Protected by mountains, from the north and east winds, and exposed to the mid-day sun, the Rheingau produces wines of the best quality, as Johannisberger, Rüdesheimer, Marcellenm, Assmannshäuser, &c.

Rhenish Architecture, the style of the countries bordering on the Rhine when the arts first revived after the fall of the Roman empire. They and Lombardy being at the time of Charlemagne part of the same empire, Lombard Architecture (q.v.) has considerable affinity with those north of the Alps. Some very early examples of this style are still to be found in Switzerland. Architecture received great encouragement from Charlemagne and his successors, and the Rhenish style made great progress up to the beginning of the 13th century, when the fashion of copying the Gothic architecture of France superseded it. It is, however, a well-marked style, and is complete and perfect in itself. Like the Lombard style, it is round-arched, and has some remarkable peculiarities. Many of the earliest churches seem to have been circular (like the cathedral at Aix-la-Chapelle, built by Charlemagne), but in course of time the circular church was absorbed into the Basilica, or rectangular church (see ROMANESQUE ARCHITECTURE), in the form of a western apse. Most German churches thus have two apses—an eastern and a western. They also have a number of the circular towers, or octagonal towers, which seem to be similar to origin in the Round Towers of Ireland. They exemplify in a remarkable manner the arrangements of an ancient plan of the 9th century, found in the monastery of St Gall, and supposed to have been sent to the abbot, as a design for a perfect monastery, to aid him in carrying out his new buildings. The arcaded galleries at the caves, and the richly-carved capitals, are among the most beautiful features of the style. Examples are very numerous from about 1000 to 1200 A.D. The three great specimens of the style are the cathedrals of Mainz, Worms, and Spires. The last is a magnificent building, 435 feet long by 125 feet wide, with a nave 45 feet wide, and 102 feet high. It is grand and simple, and one of the
most impressive buildings in existence. There are also numerous fine examples of the style at Cologne—the Apostles' Church, St. Maria im Kapitol, and St. Martin's being amongst the most finished examples of Rhenish architecture. The illustrations of the church of the Benedicente abbey at Iaech, near Coblenz, explain the peculiarities of plan and elevation above referred to. The vaults in this case being small, the different spans were managed (although with round arches) by stitling the springing; but in great buildings like Spires and Worms the vaults are necessarily square in plan, in this round-arched style, and the nave embraces in each of its bays two arches of the side aisles—a method also followed by the early Gothic architects. From the use of the round arch and solid walls, the exteriors are free from the great mass of buttresses used in Gothic buildings, and the real forms are distinctly seen (see APSE).

Rhenish Prussia (Ger. Rheinprovinz, Rheinland, or Rheinpreussen), the most western and most thickly populated of the provinces of Prussia, lies on both sides of the Rhine and the Lower Moselle, and is bounded on the W. by Luxemburg, Belgium, and the Netherlands. Long and narrow, it extends from Cleves in the north to Straßmünd in the south, has Cologne near the middle of its area, Aix-la-Chapelle (Aachen) and Treves near its western boundary, and Coblenz (the capital), Elberfeld-Barmen, and Essen near its eastern boundary, whilst Bonn lies south-east of Cologne, and Düsseldorf and Crefeld N. by W. of it. Area, 10,419 sq. m.; pop. (1885) 4,344,027; (1890) 4,710,313, of whom about 3,400,000 are Roman Catholics, and 10,000 Walloons. The surface is everywhere more or less mountainous, except in the extreme north, reaching 2000 feet on the west of the Rhine, but only 1800 on the east side. The soil of the higher tracts is not very fertile, and is largely forest land; but the valleys of the Rhine, Moselle, and Nahe are very fruitful, and so are the flat districts in the north. Of the total area, 64 per cent. is cultivated, including meadows and vineyards, and nearly 51 per cent. under forest. Grain, potatoes, beet-root, tobacco, hops, flax, &c., are the more important crops. Much wine and large quantities of vegetables are grown. More than sixteen million tons of coal are mined in the year, also large quantities of iron, zinc, and sulphur acid (at Essen, Siegen, Remscheid, &c.); cloth and buckskin (Aix-la-Chapelle and Burscheid) have a European reputation. Industry and manufactures are presented with the greatest energy and success, this province ranking first in all Prussia in this respect. Iron, lead, zinc, and sulphuric acid (at Essen, Siegen, Remscheid, &c.); cloth and buckskin (Aix-la-Chapelle and Burscheid); silk, velvet, and similar wares (Crefeld, Elberfeld-Barmen, Mülheim), cottons (Cologne, München-Gladbach, and Elberfeld-Barmen), linen (Gladbach and Nen), leathers (Malmedy), glass and pottery, paper, chemicals (Duisburg, Aix-la-Chapelle), soap, sugar, beer, spirits, and perfume (eau de Cologne) are all manufactured on a large scale. There is a university at Bonn. This province was formed in 1815 out of the duchies of Cleves, Jülich (Juiliers), Guelders, and Berg, and numerous minor territories. It is defended by the four fortresses of Cologne, Coblenz (Ehrenbreitstein), Wesel, and Saarbröich.

Rheostat, the name given by Wheatstone to an instrument for varying an electric resistance between given limits. Many forms have been suggested and used by Pouillet, Jacobi, Poggendorf, Wheatstone, and others. The most serviceable is the patent of W. Thomson, in which the combination of Wheatstone's double-cylinder rheostat. In it a platinum or platinoid wire is wound round the two parallel cylinders, one of which is metal and the other of some insulating material. In any position the part of the wire which is effective as a resistance is the part that is on the insulating cylinder up to where it comes in contact with the metal cylinder. By means of a gearing of toothed wheels and screw shaft the two cylinders are turned simultaneously in one or the other direction, while at the same time a nut travels to or fro and guides the wire as it leaves the one cylinder and calls itself round the other. See ELECTRICITY.

**Rhesus Monkey**, or Bonder (Macacus rhesus), a widely distributed and common Indian monkey. Like the Entellus (q.v.) or Hanuman, it is in part migratory, visiting the Himalayas in summer, and sometimes found at a level of 8000 feet. The body is stout, the limbs are strong, the skin hangs in loose folds about the neck, breast, and abdomen. The hair is grayish or brownish on the back and lighter beneath; the naked parts are copper-coloured; the large ishial callouses are bright red. It is a very intelligent and mischievous monkey, and readily tamed when young. It is held in almost as great veneration by the natives of India as the Hanuman itself; and the killing of one of these animals is apt to arouse the greatest popular indignation. The monkeys live in troops in the forests, chiefly in hilly districts, and visit the cultivated grounds to carry away grain and other produce, which they store up for themselves among rocks. The native farmers leave a share for the monkeys, believing this to be necessary to avert their anger, as otherwise they would next year destroy the whole crop whilst green.

**Rhetoric** (Gr. rhētorikê) in its broadest sense may be regarded as the theory and practice of eloquence, whether spoken or written. It aims at expounding the rules which should govern all prose composition or speech designed to influence the judgments or the feelings of men, and therefore treats of everything that relates to beauty or force of style, such as accuracy of expression, the structure of periods, and figures of speech. But in a narrower sense rhetoric concerns itself with a consideration of the fundamental principles according to which particular discourses of an oratorical kind are composed. The first to reduce oratory to a system were the Sicilian Greeks; its actual founder is said to have been Corax of Syracuse (c. 500 B.C.). He divided the speech into five parts, prose, narrative, arguments, subsidiary remarks, and
RHEUMATISM

peroration; and he laid great stress on the rhetorical capabilities of general probability. Later masters of rhetoric were Tissias; Gorgias of Leontini, whose style was burdened with too much ornament and antithesis; Antiphon, the earliest of the sophists, the father of modern law, and the first writer of speeches for others to deliver in court. The speeches given by his great pupil Thucydides throughout his history, and the orations of Andocides, second of the Ten, are severely free from the florid ornament of later days. Lysias was an orator rather than a rhetorician. He appears to have been thoroughly taught rhetoric, which he defined as the 'science of persuasion,' as a technical method and discipline. His most celebrated pupils were Hyperides, Speusippus, and Isaeus. The great Demosthenes was a pupil of the last. His opponent, Euxines, and his contemporaries Hyperides, Lyceurgus, and Dinarchus complete the Ten.

Anaximenes of Lampscus composed the oldest extant manual of rhetoric, but the great classical work on this subject is the analytical masterpiece of Aristotle. According to him its function is not to persuade, but to discover the available means of persuasion in any subject. He regards it as the counterpart of logic, and arranges its uses as (1) the means by which truth and justice assert their supremacy over falsehood and injustice; (2) the only method of persuasion which secures the audience; (3) a means of seeing both sides of a case and of discerning the weakness of an adversary's argument; (4) a means of self-defence. The means of persuasion he groups in two classes: (1) the means of important propositions, such as reasons, witnesses, contracts, and the like; (2) the artificial devices, whether these are (a) logical, demonstration or seeming demonstration by argument; (b) ethical, when the speaker induces confidence by the weight of his own character; or (c) emotional, when he works the feeling of his hearers.

Of these artificial proofs, first comes the logical, and this depends on the enthymeme, 'a syllogism from probabilities' and signs; next is the example. Of the materials of enthymemes, the topics or commonplaces of rhetoric, Aristotle distinguishes between the general and the special or applicable to all subjects as to their possibility or impossibility, and the special, those drawn from special arts or faculties.

He divides the three provinces of rhetoric thus: (1) the forensic or rhetorical concerning with exhortation or dissuasion, and future or present time; ends expediency and inexpediency; (2) Forensic rhetoric, concerned with accusation or defence, and with time past, its ends justice and injustice; (3) Epideictic rhetoric, concerned with eulogy or censure, and usually with time present, its ends being honour and disgrace, or nobleness and shamefulness. In his first two books Aristotle deals with invention, the discovery of means of persuasion; in the third, with expression and arrangement; and he begins the subject by discussing the art of demonstration or of proof. Under ethical division he discusses the use of metaphor, simile, proverbs, rhythm, and variety of styles, as the literary and controversial, whether the political or the forensic.

Aristotle's method dominated the Peripatetic school, but later began to be modified by the florid influence of the Cynics. As the orator, Hegesia of Magnesia. The school of Rhodes followed more closely Attic models, and gained great fame through its conspicuous leaders Apollonius and Molon (c. 100-50 B.C.). Hermogenes of Tarent delivered the 'Ten Attic Rhetoricians,' which long retained its influence. Later rhetoricians were Dionysius of Halicarnassus, Longinus, Hermogenes, Apelles, Menander, Theon, and Aphthonius. Among the earliest Roman orators were Appius Claudius Cæsus (c. 300 B.C.), Cato the Censor, Ser. Sulpicius Galba, Caius Graceæus, Marcus Antonius, and Lucius Licinius Crassus. The instructors in formal rhetoric were Greek, and the great masters of theoretical and practical rhetoric alike. Cicero, Quintilian, and Orison, were formed by Greek models. The former contributed to a discussion of its theories no less than three treatises, De Oratore, the Brutus, and the Orator: the latter's famous Institutio Oratoria still retains its value. Quintilian strove hard to reform the taste of the times, and he gives first place through exclusive attention to the form and perpetual exercises in the schools on imaginary subjects—the suasorius and controversius of the elder Seneca. The Dialogus de Oratoribus, long ascribed to Tacitus, was another protest against modern fashion and abuse. In the twelfth century, long remained a model for later orators. During the first four centuries of the empire rhetoric continued to be taught by 'sophists' at Athens, Smyrna, Rhodes, Tarsus, Antioch, Alexandria, and Marseilles, and thence spread to other cities. Hadrian, the Antonines, and Marcus Aurelius, among the most celebrated were Tácceotus, Pólenon, and Adrian of Tyre. Throughout the middle ages rhetoric formed one of the subjects of the triensium; its leading authors were Martinaeus Capnellus, Gellius, and Justinian. These and other masters, of whom the most illustrious is Longinus, taught that the subject re-awoke with the revival of learning, and was taught regularly in the universities, the prescribed public exercises and disputations keeping it long alive; but in later generations it has constantly languished, in spite of more or less laborious or effective attempts to fan it into life by such as the pre-eminent Blair, the solid Campbell, and the sagacious Whately. In America, however, considerable attention is paid to it as a branch of general education.

See Aristotle's Rhetorique, with notes by E. M. Cope and J. E. Tandy (3 vols. 1877), The Introduction, and Analysis by E. M. Cope (1867), and Translation by J. E. C. Weldon (1886); C. Ritter, Die Quintilianische De- klation (1811); R. Volkman, Die Rhetorik d. Gr. (1872); Book iv. of St. Augustine's treatise On Christian Doctrine; and J. Bascom's Philosophy of Rhetoric (New York, new ed. 1885). For the practical art of Rhetoric or Oratory, see M. Bautin, The Art of Eloquence (New York, 1885); A. Pinkly, The Essentials of Eloquence and Oratory (New York, 1884); and C. W. Theodore, Rhetoric (1884).

Rheumatism (from the Gr. rheuma, 'a flux') is a term which has been, and still is, rather vaguely and extensively used in the nomenclature of disease. But there is one very definite affection to which it is always applied; after this has been discussed the other senses in which it is used will be considered separately.

Acute rheumatism or rheumatic fever is indicated by general febrile symptoms, with redness, heat, swelling, and usually very intense pain, in and around one or more (generally several, either simultaneously or in succession) of the larger joints, and the disease is terminated by which sets in to joint or to certain internal serous membranes, especially the pericardium and the endocardium; rheumatism being the most common origin of periarticular, as has been already shown in the article on that subject. If prevented from reaching the joint there is headache, but seldom delirium, unless in very severe cases; the tongue is covered with a creamy thick fur, the tip and edges being red; the urine is turbid, and abnormally acid; and the skin
Rheumatism

is bathed in a copious perspiration, with so characteristic a smell (resembling that of sour milk) that the physician can often recognize the disease almost before he sees the patient. The joints are extremely painful, and the pain is much increased by pressure, and consequently by movement which gives rise to internal pressure. Hence the patient lies fixed in one position from which he dares not stir.

The usual exciting cause of acute rheumatism is exposure to cold, and especially to cold combined with moisture, and hence the greater prevalence of the disease in the Northern States. Sitting in damp sheets or upon the damp ground, the wearing of wet clothes, and sitting in a cold damp room, especially if the sitter was previously warm from exercise, are examples of the kind of exposure which is apt to be followed by this disease. Rheumatism is not, however, a universal sequence to exposure to the cold. It only occurs when there is a special predisposition, or, as it is termed, a rheumatic diathesis or constitution, and the diathesis may be so strongly developed as to occasion an attack of acute rheumatism, independently of exposure to cold. Acute rheumatism is often associated with Chorea (q.v.); but the exact nature of the relation between the two is not known. Scarlet fever is the only other disease which seems specially liable to be followed by acute rheumatism. Men are more subject to the disease than women, and children under ten years being comparatively seldom attacked, while the disease is most prevalent between the ages of ten and forty. Again this age is a frequent and important cause. Acute exposure to atmospheric changes on account of the nature of their occupations. The predisposition is certainly affected by age; children under ten years being comparatively seldom attacked, while the disease is most prevalent between the ages of ten and forty. Acute rheumatism is rare, and even recurrences are less frequent than earlier in life. Persons once affected become more liable to the complaint than they previously were. The disease is hereditary in a considerable proportion of cases; and even when it cannot be traced in previous generations the predisposition is very apt to exist in several members of the same family. The exact nature of the disease poison is unknown. Dr Prout regarded lactic acid as the actual materiis morbi, but, though certain facts tend to confirm this view, it cannot be regarded as satisfactorily proved.

In the great majority of cases acute rheumatism ends in recovery; and permanent damage to the affected joints is rare. It is, however, extremely apt to recur, either in the early stages of convalescence, or after an interval of months or years. The chief danger arises from implication of the heart, which very frequently occurs; probably in about one-half of those suffering for the first time either the pericardium or endocardium or both are affected. The younger the patient the greater the liability to these complications, which usually result in more or less permanent impairment of the heart's action (see Heart, PERICARDIUM). Another condition, much less common, but extremely fatal, is known as rheumatic hyperpyrexia, and is characterized by a very rapid rise of temperature to 108° or even 110°; it is of a fulminating form, the term either of drowsiness or of violent delirium.

The patient should be strictly confined to bed between blankets (i.e. without sheets), and be clothed in flannel; he must be carefully protected from draughts, and from undue pressure of the bedclothes. He should be kept well supplied with hot and blisters. Under such conditions, without other treatment, most cases recover in the course of time. Till the last quarter of the 19th century there was no general agreement as to what more should be done. When bleeding was used for most acute diseases this one was no exception. When that practice was abandoned numerous drugs were used, in some cases with apparent success. Quinine, iron, lemon juice, colchicum, large blisters to all the affected joints, were all recommended; more in favour than any of these were alkalis in large doses. But in 1870 Stricker in Berlin and MacIagan in England called attention to another method of treatment which is now almost universally adopted. Though new to Europe it has long been in use elsewhere, for the natives of South Africa have from time immemorial treated the disease by willow-top infusion. This method consists in the administration of Saliea (q.v.), or one of its derivatives (salicylic acid, salicylate of soda, &c.). The last is at present most largely used. It is usually given in doses of 15 or 20 grains every two or three hours at first; but its action needs to be carefully watched, as it often causes considerable depression and other uncomfortable symptoms. It is administered by almost all observers that it has a remarkable effect in reducing the fever, relieving the pains, and cutting short the attack; but under this treatment, as without it, relapses are frequent. In rheumatic hyperpyrexia the only treatment that has been found effective is to lower the temperature as the temperature rises to a dangerous point. Convalescence is usually very slow, and it is necessary to keep the patient in bed and on low diet for some time after the fever has disappeared to diminish the tendency to relapse. At this stage tonics, especially quinine and iron, are used, and a greater exposure to atmospheric changes on account of the nature of their occupations. The predisposition is certainly affected by age; children under ten years being comparatively seldom attacked, while the disease is most prevalent between the ages of ten and forty. Acute exposure to atmospheric changes on account of the nature of their occupations. The predisposition is certainly affected by age; children under ten years being comparatively seldom attacked, while the disease is most prevalent between the ages of ten and forty. Acute exposure to atmospheric changes on account of the nature of their occupations. The predisposition is certainly affected by age; children under ten years being comparatively seldom attacked, while the disease is most prevalent between the ages of ten and forty.
RHEUMATIC DISEASES OF ANIMALS.—These are less common than the corresponding affections of men. Horses are not very liable to acute rheumatism, but suffer from a chronic variety, which proceeds in after the fever and influenza. When affecting the limbs it often exhibits its characteristic tendency to shift from one part to another. In cattle and sheep rheumatic disorders are more common and acute than in horses. The specific inflammation sometimes involves most of the fibrous and fibro-serous textures throughout the body, inducing general stiffness, constipated bowels, and high fever. This is rheumatic fever—the chine-felon or body-garget of the old farmers. Sometimes the disease mainly affects the larger joints, causing intense pain, lameness, and hard swellings; occasionally it is confined to the feet and fetlocks, when it is recognised as bastian-foul. Cattle and sheep on bleak exposed pastures, and cows turned out of the dairy to feed on strong alluvial grazings are especially subject to rheumatism in its several forms. Amongst dogs rheumatism is known under the name of kennel lameness, and is very troublesome and intractable in low, damp, cold situations. Blood-letting is rarely admissible except in the most acute cases amongst cattle. In all animals a laxative should at all times be given; and stimulants such as aconite, and colchicum, and when the pain and fever are great a little tincture of aconite may be added. For cattle a good combination consists of one ounce of nitre, two draehms of powdered colchicum, and two fluid draehms of the Pharmacopoeia tincture of aconite, repeated in water or gruel every three hours; half this dose will suffice for horses. With a simple laxative diet dogs should have a pill night and morning containing five grains of nitre and two of colchicum. Comfortable lodgings, a warm bed, horse-rugs on the body, and bandages on the limbs will greatly expedite a cure. In chronic cases, or after the more acute symptoms are subdued, an ounce of oil of turpentine and two draehms each of nitre and powdered colchicum should be given for a cow, half that quantity for a horse, and one-fourth for a sheep. Harshin and oil, or other stimulating embrocations, diligently and frequently rubbed in, will often abate the pain and swelling of the affected joints.

Rheyd, a town of Rosenh Prussia, 19 miles by rail W. by S. from Düsseldorf, has manufactures of silks, velvets, cottons, machinery, hardware, paper, blankets, dyeworks, and breweries. Pop. (1889) 19,687; (1890) 23,692.

Rhine. See RHYME.

Rhin. Bas and Haut, until 1871 frontier departments of France, corresponded pretty nearly to what are now the two administrative districts of Lower and Upper Alsace, in the German imperial territory of Alsace-Lorraine (q.v.)—Bas Rhin corresponds to Lower Alsace, and Haut Rhin to Upper Alsace. See also BERTHOF.

Rhine (Ger. Rhein, Fr. Rhin, Dutch Rhijn, Lat. Rhenum), in every way one of the most important rivers of Europe. A large number of rivulets, issuing from glaciers, unite to form the young Rhine; but two are recognised as the principal sources; the first, or eastern Rhine, former emerges on the north-east slope of the Gotthard knot (7690 feet above sea-level), and only a dozen miles from the cradle of the Rhine, on the other side of the same mountain-knot; the Farther Rhine, or western Rhine, as it is sometimes called, with a length of 1230 feet (7270 feet), not far from the Pass of Bernadino. The two mountain-torrents meet at Reicheinan, 6 miles SW. of Coire (Chur) in the Grisons canton, after they have descended, the Nearer Rhine 3577 feet in 29 miles in a north-easterly direction, theFarther Rhine 5347 feet in 27 miles along a northerly course. At Coire the united stream strikes due north, and, after plunging its way for 45 miles between Switzerland and Austrian Vorarlberg, enters its first lake, the Lake of Coire (1306 feet above the sea). It leaves this lake at its north-western extremity, a little below Constance, its water a deep transparent green, and flows generally westwards, in three or four wide curves, to Basel, separating Baden on the north from Switzerland on the south. At Basel the river (490 feet wide) plunges down the falls of Schaffhausen, nearly 70 feet in three leaps, and races over narrow rapids at three separate places where the terminations of the Jura Mountains intrude into the valley; from these falls it receives the waters of the Swiss Aar. Basel is 290 miles distant from the source of the Nearer Rhine following the windings of the channel, but only 85 miles as the crow flies.

At Basel (742 feet) the river, now 225 yards wide, rounds to the north, and traversing an open shallow valley that separates Aalst and the Bavarian Palatinate from Baden, reaches Mainz (50° N. lat.) in Hess-Darmstadt, north-east from Basel. This valley is fenced in by the Black Forest on the east and by the Voges on the west, and among their ridges and halts Millhausen, Colmar, Strasbourg (on the Ill, 2 miles from the Rhine), Gernersheim, Spiez, Ludwigshafen, and Worms, all on the Alsatian side, and Freiburg, Baden, Rastatt, Carlsruhe, Mannheim, Heidelberg, and Darmstadt on the opposite side of the river. Along this section the Rhine splits into many side arms that flow parallel to the main stream, and is studded with green islands. Navigation, however, which begins at Basel (although boats ply for short stretches on the upper waters above that town that are higher, and others, higher still), is facilitated by artificial means, in that the current is made to flow in a carefully kept, straightened channel. Of the numerous affluents which add their waters to the volume of the Rhine along this section the largest are the Neckar and the Main, both coming from the right, and both navigable; the Ill, which falls into it from the left, is also navigable. A little below Mainz the Rhine (685 yards wide) is turned west by the Taunus range; but at Bin gen it forces a passage through, and pursues a north-westerly direction across Rhinen Prussia, parts of Hesse, part of Bavaria, part of the Ruhrort, and Wesel as far as the Dutch frontier, which it reaches a little below Emmerich, and opposite Cleves; here it is 1875 yards wide and 36 feet above sea-level. The first half of this portion of the river from Bingen to Bonn is the Rhine of song and legend, the Rhine of romance, the Rhine of German patriotism. Its banks are clothed with vineyards that yield wine esteemed the world over (see below); the rugged and fantastic crags that hem in its channel are crowned by ruined castles; the tresserns and cliffs of the Vibelung, and the rapids of the river, but higher up, at Worms; the Binger- loch (see BINGEN) and the Mouse Tower of Bishop Hatto, the fortress of Ehrenbreitstein, the rock of the siren Lorelei, the commanding station of Germany (the trophy of German victory in 1870), and numerous other romantic and historic spots. Of the Rhine, which is the middle course of 'Father Rhine,' as his German children call him. It still inspires them, as in 1870, when Max Schneckenburger's Wacht am Rhein (written in 1849; the music by K. Wilhlem, 1854) was sung by them, the grandest and most martial of the German citizens as they looked into France. There is the Rheinlied, too, of Nikolaus Becker, with Alfred de Musset's retort, Nos Pavons en, vôtre Allem ont, both of them written in 1841. Between Bingen and Bonn the steep rocky walls that fence
the river approach so closely together that in many places there is not room for the carriage-road and the railway to run alongside; they have to find a way through tunnels. Mainz (260 feet) is the head of steamboat navigation from Rotterdam. The Nahe enters the Rhine at Rüthen, the Moselle at Coblenz; from the opposite (right) side the Lahn enters just above Coblenz. A few miles beyond the Rhine rafting rafts are formed out of smaller ones, floated down from the Black Forest and the woods towards Lorraine and the Palatinate, and are then steered by the numerous men who live on them right down to Dordrecht in Holland, where they are sold. Below Bonn the Rhine is joined by the Sieg, Wupper, Ruhr, and Lippe, all from the right.

At Bonn the river enters the plains, and almost immediately after passing the Netherlands frontier its delta begins. The principal arm, carrying two-thirds of the volume, flows under the name of the Waal, and later the Mermele, due west past Nimegen until it reaches Dordrecht. East of the Biesbosch it picks up the Maas (Meuse) from the left. At Dordrecht the river again divides, one branch, the old Maas, running out to sea; the other, the Nörd, going to Rotterdam. To the mouth of this town it is joined by the Lek, another main arm of the deltaic complex, and below which town it once more unites with the Old Maas. The arm that strikes out northward at the point where the delta begins soon divides, sending one branch, the Yssel, due south to Rotterdam. The other arm runs to the east side near Kampen; the other branch is the Lek, which runs into the Waal-Maas arm above Rotterdam. A thin stream called the ‘Winding Rhine’ leaves the Lek half-way between Arnhem and Rotterdam; but it again splits at Utrecht into two branches. It is the stream with a perennial current, comparatively speaking, manages with the help of a canal and locks to struggle into the North Sea at Katwyk, a little to the northwest of Leyden, while the other channel, the Vecht, flows due north from Utrecht until it enters the Zuider Zee, a short distance from Amsterdam. For considerable distances in these delta regions the rivers are only kept from overflowing the country by artificial banks or dykes. The area drained by the Rhine is estimated to be 75,773 sq. m., making its total length be 766 miles, of which 350 in all are navigable. By means of the Lüneburg Canal it is connected with the Danube; the Rhine and Rhine Canal unites it with the IJssel, and so with the Mediterranean; another canal provides a waterway between it and the Meuse, a tributary of the Seine; and yet a fifth unites it with the Zuider Zee at Amsterdam. The fisheries of the Rhine are of considerable importance; salmon, carp, pike, sturgeon, and lampreys—the fish of greatest value—are taken principally near St Goar, between Bingen and Coblenz. The waters are partly re-stocked from the fish-hatcheries of Hühningen in Upper Alsace (see Pisciculture).

Commercially and historically the Rhine is one of the principal rivers of Europe. It was the Romans’ strongest bulwark against the Teutonic invaders, and afterwards it encouraged commerce to travel up and down its waters, and kept its channel open. Under Charlemagne the ravages caused by the Teutons having broken through the Roman girdle along the Rhine and inundated Gaul were rapidly obliterated, and the Rhine was the principal means of civilization in the early empire. Except between 1897 and 1871 the Rhine was always a purely German river; at the peace of Ryswick, Alsace-Lorraine was appropriated by France, and the Rhine became part of the dividing line between France and Germany. In 1801, Napoleon incorporated the mouth of the left bank with France; and in 1815 the arrangement in force before 1801 was restored; and after 1871 the Rhine became once more wholly German. From the days of the Roman supremacy down to the beginning of the 19th century navigation was always more or less hampered by the riparian sovereignty along the greatest part of the time a large number of riparian privileges, which, by levied vexatious dues upon the shipping that sailed up and down past their towns and villages. From 1803 all the powers concerned, except Holland, abolished most of the shipping dues on their own territories, but England followed suit in 1833; but it was not until 1st July 1869 that the river was declared an absolutely free waterway to the ships of all nations. The first steamboat churned up its waters in 1817; now some scores ply all the way between Rotterdam and Mainz, and others along other stretches. More than 18,000 vessels of about 2,000,000 tons burden pass the frontier town of Emmenich going up stream every year. There have been various schemes for utilising the mechanical power of the Rhine current by means of turbines and electro-motors. For the practical application (1878) of the latter by taking its name from the Rhine, see Confederation of the Rhine.

Rhine-wine indicates, strictly speaking, the wines produced in the Rheinland (q.v.), the most valuable and costly being those of Castle Johannishain, Rheinauhof, and Mittelrhein. To the south of England promisously to all white Rhine wines), Rüdesheim, Steinberg, Gräfenhain, Ranenthal, Marebbe, Assmannshausen, and Geisenheim. Except the wine of Assmannshausen (Assmannshaus), which is red, these wines are of a white or yellowish tint and are generally either dry or sweet and a dry, piquant flavour. In a wider sense the term Rhine-wine includes the wines of nearly all the valleys lying contiguous to the Rhine—those of Baden, Alsace, the Moselle, Hesse-Nassau, and the Palatinate.

See the illustrated Rhine, by K. Stüeler (Eng. trans. 1878; new ed. 1887); the guidebooks of Murray and Baedeker; Simrock’s Rheinigen (4th ed. 1883) and Das malerische und romantische Rheinland (4th ed. 1885); and the history of the river from the Celtic to modern times, by Meissner and Iserhoven, 1876–79.

Rhinoceros. This genus, representing a distinct family of ungulate mammals, contains only five distinct species, to which another (R. laridus Schlegel) may be perhaps (at present, however, doubtfully) added. These five species are distributed in the hotter parts of the Old World as follows; Africa contains two forms, which are often called the ‘Black’ and the ‘White’ rhinoceros. These terms are, however, very inapt, since both of them are of a greyish black; in colour there is but little difference between R. simus and R. bicornis. They are very heavy, however, he distinguished by other points: the first species is much larger, and has a flat nose and square upper lip, while R. bicornis has the upper lip prolonged so as to enable it to seize and break off branches. Correlated with this structural difference is one of habitat; R. simus ranges in the forests, while the bicornis feeds chiefly upon shrubs. A number of other species have been stated to occur in Africa, but it appears that these ‘species’ have been for the most part founded upon unimportant differences in the length of the two horns with which these animals are furnished. In Asia there are a number of species, some of which are represented by R. unicornis, occurs only in Nepal, Bhutan, and Assam; it is a very big species. A specimen in the Zoological Society’s Gardens measured over 10 feet in length and a little more than 5 feet in height at
the shoulder. It has enormous folds of skin, which give it the appearance of being 'armour-plated.' The African species have a smooth, though of course very thick, skin. The second Asiatic rhinoceros is *R. sondaicus*, which is smaller than the last, though also one-horned; it occurs in Java, Burma, and the Sundarbans near Calcutta. The two-horned Asiatic rhinoceros (*R. sumatrensis*) is found in Malaca, and *R. lesueuri*, from Ceylon, eastern Bengal, is hardly separable from *R. latá* (q.v.). The Asiatic rhinoceroses are distinguished from the African forms by the presence throughout life of functional incisor teeth. Professor Flower has shown that the tooth characters the African species are to be contrasted with the Asiatic; in spite of its two horns, *R. sumatrensis* is more closely allied to *R. unicornis* than to *R. bicornis*; even the fossil species are rendered irreducible for the most part to one or the other group. The Siberian *R. tichorhinos* of one specimen, partly preserved through its being frozen, was found by the Russian naturalist, Pallas, belongs to the African group, which is sometimes separated under the generic name of *Atelodus*.

**Rhinoplastic Operations.** When a portion or the whole of the nose has been destroyed by accident or disease, the deficiency may be restored by a transplantation of skin from an adjoining healthy part. When the whole nose has to be replaced, the following course is usually adopted. A triangular piece of leather or gutta-percha is cut into the shape of the nose, and is extended over the forehead with its base to the temples. When its boundaries, thus flattened, are marked out on the skin with ink. Any remains of the old nose are then pared away, and a deep groove is cut round the margins of the nasal apertures. When the bleeding from these incisions has stopped, the marked portion of the skin of the forehead must be carefully dissected away, till it hangs by a narrow strip between the eyebrows. When the bleeding from the forehead ceases, the flap must be twisted on itself, so that the surface which was originally external may remain external in the new position, and its edges united and fastened with stitches to the grooves prepared for their reception. The nose thus made is to be supported with oiled lint, and well wrapped in flannel to keep up the temperature. When complete adhesion has taken place, the detached strip of skin may be cut through, or a little slit may be cut out of it, so that the skin may be uniformly smooth. Either at the first operation or subsequently a new columna (the front part of the septum) is usually formed from the skin of the upper lip. When only a part of the nose, as one side only, or the forehead with the base, have been lost, modifications of the above operation are required, and the skin, instead of being taken from the forehead, is taken from the cheek or the upper lip. This operation is called the *Indian Method*, having been introduced from the East and first successfully performed in Europe by Carpus in 1814. It has almost entirely superseded the *Talicotic operation*, first performed by Tagliacozzi or Talicottius (1546–90), professor of Anatomy and Surgery at Bologna, and described in his famous work De Curtorum Chirurgia per Insectionem (1587). He took the skin from the new nose from the arm of a patient; and there is no reason why the operation which he describes, although inferior in many respects to that at present adopted, should not be successful. The difficulty and irksomeness of keeping the arm temporarily long in the exposed state of the surface (a period of about twenty days) is the chief objection to his method. For further details, see Holme’s *System of Surgery*, or Ehrichsen’s, or any other surgical manual.

**Rhinanthæe**, one of the five classes into which Lindley divides the vegetable kingdom. There are three natural classes comprising: 1. grasses, or claviz, Balanophoraceæ, Cyttineæaceæ, and Rafflesieæaceæ, but they have been placed widely apart in the botanical systems of other botanists. The species comprising them agree only in being destitute of true leaves, in having short amorphous stems or none, and in being parasitical on roots. The structure of the flowers, which are in some instances very large,
RHIZOCARPS

The birth of the Balanophoraceae, a most interesting plant, the Fusus Melitensis of apothecaries, long celebrated for arresting hemmorhages. Others likewise are used as styptics. Cynotus hypocratis (Gr. rhizon, a 'root,' and podo, 'feet'), a division of the Protozoa, in the members of which the living matter of the cell flows out in changeable processes as 'pseudopodia.' In other words, the rhizopods are Protozoa in which the axes of the cell-life have become differentiated. The division includes several classes, of which the most important are the Lobosa, with the Amoeba as type, the Heliozoa or Sun-animalcules, the Radiolaria, and the Foraminifera. See AMOEBA, FORAMINIFERA, PROTOZOA, RADIOLARIA.

Rhizocarps. See Salyvia.

Rhizome. See Root.

Rhizo'poda (Gr. rhizon, 'a root,' and poda, 'feet'), a division of the Protozoa, in the members of which the living matter of the cell flows out in changeable processes as 'pseudopodia.' In other words, the rhizopods are Protozoa in which the axes of the cell-life have become differentiated. The division includes several classes, of which the most important are the Lobosa, with the Amoeba as type, the Heliozoa or Sun-animalcules, the Radiolaria, and the Foraminifera. See AMOEBA, FORAMINIFERA, PROTOZOA, RADIOLARIA.

Rhode Island. The smallest of the United States, and one of the original thirteen states of the Union. The state takes its name from the island of Rhode Island in Narragansett Bay. Its length from north to south is not quite 50 miles, and its width is about 40 miles; land area, 1053 square miles. Rhode Island has thus a land surface but little over 1 square mile for each of the residents. The largest state; but, while it ranks only thirty-fourth among the states and territories in point of population, in density of population (407 per sq. mile) it yields only to the District of Columbia. Its name is referred by some to a supposed resemblance of the island of Rhode Island to Rhodies in the Mediterranean, while by others it is considered to be a corruption of Rootell Engladell ('Red Island'), a name bestowed upon this island by the early Dutch.

There are no mountains in the state, but the surface is considerably diversified. The northern and eastern sections are hilly, and the land slopes toward a level region in the south. The most important elevations are Woonsocket Hill, Mount Hope, Diamond Hill, and Hopkins Hill. The coast along the Atlantic Ocean measures about 45 miles, but Narragansett Bay, which penetrates inland some 30 miles, affords with its various inlets about 350 miles of shore washed by tide water. The southern coast west of Point Judith is low and sandy, with numerous fine beaches, and many marshes and ponds of salt water. To the north the shores are formed by high rocky cliffs interspersed with beaches of sand. Newport, Narragansett Pier, and Watch Hill, on the ocean coast, are among the most famous seaside resorts of the country; and Block Island, about 10 miles SW. of Point Judith, is also a favorite watering place.

The western part of the state is marked geologically by the Archaean formation, which is characteristic of much of New England, but an extensive coal-bearing area of the Carboniferous period stretches under the bay across the eastern part of the state. On the Connecticut side the most extensive coal field of anthracite in the United States, but thus far the coal which has been mined has been of inferior quality. There are deposits of iron ore, and excellent limestones and granite. Traces of the terminal moraine of the glacial period are visible in the state, and in many places the soil is stony or rocky, though in some localities it is moderately fertile. Agriculture, however, except in the way of market-gardening, is by no means a leading occupation.

Rhode Island enjoys a maritime climate, milder and more agreeable than that of the other provinces of New England. The rivers of the state are of little importance for navigation, but are of great value in furnishing water-power, and have played a prominent part in developing the industries of the state. The principal rivers are the Seekonk, navigable to Pawtucket, the Woonasquatucket, the Pawtuxet, and the Pawcatuck.

Newport has one of the finest harbours in the world; and the bay affords an extensive area of safe anchorage, with excellent ports at Bristol, Warren, and Providence. Formerly these places enjoyed a large foreign commerce, which finally disappeared with the war of 1812, and, though a considerable coasting trade is still carried on, commerce from that time ceased to be a prominent industry. It was replaced by manufacturing, which has ever since been the characteristic occupation of the people. The cotton-manufacturing industry of the United States had its birth in Rhode Island. In 1790 Samuel Slater, who had been an apprentice in England, built at Pawtucket, Falls the first cotton-mill of America. He equipped the mill throughout with a complete set of machinery which he constructed from memory, and by the time Rhode Island had ceased to be a commercial state it had already upwards of fifty cotton-mills. Cotton manufacturing, with dyeing, bleaching, and calico-printing, still holds the first place among the industries of the state, followed in importance by the manufacture of linen and woolens. The cotton goods—especially socks, locomotives, and firearms—and of jewellery (see PROVIDENCE), rubber and leather goods, &c.

Rhode Island has five counties and five cities,—Providence and Newport, the state capitals, Pawtucket, Woonsocket, and Central Falls. It sends two members to congress. The common school system, established in 1828, is the highest order; but on account of the number of foreign-born persons attracted to the milling villages, and the difficulty in such communities of securing regular attendance, the school system is less uniform than is the case in the state in general. The northern New England towns suffer from the prevalence of illiteracy. In 1807 there were 50,428 pupils enrolled at the elementary schools, with 1086 teachers; 2909 pupils and 131 teachers in high schools; and 850 students and 76 professors at Brown University (1764), one of the oldest and best colleges of the country.

The Northmen are supposed to have visited Rhode Island in the 10th century; and the 'Old Stone Mill' at Newport (q.v.) has been claimed as their work. The first permanent settlement was made at Providence by Roger Williams in 1636. He and other Annamurian adventurers took land from the Indians, and, as a result of the wise policy displayed toward the natives, Rhode Island suffered less from trouble with the Indians than many of her sister colonies. Rhode Island was the last (1730) of the original thirteen states to ratify the constitution. She took an active part in the Revolution, the war of 1812, and the civil war. Pop. (1730) 17,925; (1800) 97,199; (1880) 276,531; (1890) 345,506; (1900) 429,593.

Rhodes, an island of the Mediterranean belonging to Turkey, formerly an important, wealthy, and powerful state. It is 12 miles off the south-west coast of Asia Minor. It is 49 miles long and 21 broad, and is traversed in the direction of its greatest length—north-east to south-west—by a chain of mountains, which in Mount Artemis (the ancient Athyris) reach a height of 4070 feet. The soil is on the
[Rhode Island.]
whole fertile, and produces wine, oranges, figs, olives, and other fruits. Nevertheless, much land lies waste, and the population is decreasing—34,000 in 1843; 28,000 in 1890, all Greeks except 7000 Turks and 2500 Jews. The harbours are neglected, and the trade is inconsiderable (£140,000 a year).

Sponges are the most valuable article of export. Rhodes was the Dorian Greeks from Argos. Situated between the three ancient continents, a position highly favourable to the development of commercial enterprise, the Rhodians at an early period became very prosperous and affluent. Their three mother cities were Lindus, Ialysus, and Camirus, and they planted numerous colonies not only on the neighbouring shores, but also on the coasts of Italy, Sicily, and Spain. With Cos and Cnidus these three towns formed the Doric Pentapolis, a religious league. The island submitted to the Persians in 490 B.C., but was freed from their yoke by Themistocles after the battle of Salamis; the Athenian supremacy, however, soon took the place of the Persian. Athens and Sparta supported the democratic and the oligarchical parties in the island, respectively, but the democratic (supported by Athens) went on until Rhodes submitted to Alexander of Macedon in 332 B.C.; but after his death the Rhodians revolted again. Then began their most prosperous period; they became the first naval power in the Egyptian, their ships being well built, and always splendidly manned and manoeuvred. As allies of the Romans, they opposed the Macedonians, and later the empire of Syria, especially Antiochus the Great; but on the whole they preserved a steady neutrality. Later still they won greater glory by beating off Mithridates the Great, who laid siege (88 B.C.) to the city. After coquetting with Ptolemy, the Rhodians finally sided with Caesar; but, venturing to oppose Cassius, the city was plundered by him (43 B.C.), and he put all the city except the temple under a fine.

The island was struck a fatal blow at her naval power. Under Vespasian Rhodes was made a Roman province, and continued so, subject to Byzantium after the division of the Roman empire, until it was captured by the Saracens in 623 (or 672); who kept it, however, only five years. Shortly after this, however, began, Rhodes was a convenient stopping-place for the Christian fleets. In 1125 it was plundered by the Venetians; in 1204 a Rhodian chief asserted the independence of the island, but thirty years later he felt compelled to put himself under the sovereignty of Venice. In 1428 the city was surprised by the Genoese, but they were soon turned out by the Byzantines, and so Rhodes came back to the eastern emperor. In 1309, after a three years' siege, the city fell into the hands of the Knights Hospitallers (q.v.); and the Knights made it their headquarters. The Turks besieged them there in 1480, and again in 1522-23; on both occasions there was terrible fighting, the Turkish losses being 25,000 and 90,000 to 100,000 men during the two sieges respectively. The Knights, who had only 1600 soldiers (and 400 were sent off their enemies in 1480, were compelled, in spite of their valour and the skill of their grand-master, De Lisle Adam, to capitulate on honourable terms in 1525; they sailed away to Crete. The island has remained a Turkish possession since 1523. It was girt about by strong walls, surrounded by towers, and was provided with 60 excellent harbours. At the entrance of one of its ports stood the gigantic statue of Helios, the Colossus (q.v.).

The city stood at the northern extremity of the island, on the slopes of a natural amphitheatre, and was built on a regular plan, the unity and harmony of its architecture being due to the circumstance that it was the work of one man, Hippodamos of Miletus, the builder of the Piraeus. It was girt about by strong walls, surrounded by towers, and was provided with 60 excellent harbours. The entrance of one of its ports stood the gigantic statue of Helios, the Colossus (q.v.). Besides this statue, one of the seven wonders of the ancient world, 3000 others, of which 100 were colossal, adorned the city, of which 70 were in A.D.

The city was built on the same scale of architectural splendour after each successive destruction by the earthquakes. The arts were prosecuted with assiduity, the city being remarkable for the number and excellence of its paintings, and the grand master's palace. The cit a stalls viva Is the Aeacoon (q.v.) and the Farnese Bull (at Naples); and intellectual activity manifested itself here long after it had declined in most parts of Greece. Parrhasius and Protogenes are celebrated amongst the painters of Rhodes, Lysippus, Chares, Polydorus, Athenodorus amongst her sculptors, and Cleobulus (one of the seven wise men), Timocreon (the scurrilous poet), Euphrates (the Aristotelian), Pametius (the philosopher), and others amongst her writers. Her school of rationalism was very famous, and the rhodian or serenissin of ancient geographers passed through Rhodes. The island produced also many celebrated athletes. The existing city dates for the most part from the period of the Knights' occupation.

The streets are narrow and winding, the houses solidly built, with flat roofs; but the famous street of the Knights, running down to the harbour, is long and comparatively wide. The principal buildings that survive are the church of St John (now a mosque, but in part destroyed by a gunpowder explosion in 1856), the Knights' hospital, and the grand master's palace. He came back viva Is the Aeacoon (q.v.) and the Farnese Bull (at Naples); and intellectual activity manifested itself here long after it had declined in most parts of Greece. Parrhasius and Protogenes are celebrated amongst the painters of Rhodes, Lysippus, Chares, Polydorus, Athenodorus amongst her sculptors, and Cleobulus (one of the seven wise men), Timocreon (the scurrilous poet), Euphrates (the Aristotelian), Pametius (the philosopher), and others amongst her writers. Her school of rationalism was very famous, and the rhodian or serenissin of ancient geographers passed through Rhodes. The island produced also many celebrated athletes. The existing city dates for the most part from the period of the Knights' occupation.

The streets are narrow and winding, the houses solidly built, with flat roofs; but the famous street of the Knights, running down to the harbour, is long and comparatively wide. The principal buildings that survive are the church of St John (now a mosque, but in part destroyed by a gunpowder explosion in 1856), the Knights' hospital, and the grand master's palace. He came back viva Is the Aeacoon (q.v.) and the Farnese Bull (at Naples); and intellectual activity manifested itself here long after it had declined in most parts of Greece. Parrhasius and Protogenes are celebrated amongst the painters of Rhodes, Lysippus, Chares, Polydorus, Athenodorus amongst her sculptors, and Cleobulus (one of the seven wise men), Timocreon (the scurrilous poet), Euphrates (the Aristotelian), Pametius (the philosopher), and others amongst her writers. Her school of rationalism was very famous, and the rhodian or serenissin of ancient geographers passed through Rhodes. The island produced also many celebrated athletes. The existing city dates for the most part from the period of the Knights' occupation.

The streets are narrow and winding, the houses solidly built, with flat roofs; but the famous street of the Knights, running down to the harbour, is long and comparatively wide. The principal buildings that survive are the church of St John (now a mosque, but in part destroyed by a gunpowder explosion in 1856), the Knights' hospital, and the grand master's palace. He came back viva Is the Aeacoon (q.v.) and the Farnese Bull (at Naples); and intellectual activity manifested itself here long after it had declined in most parts of Greece. Parrhasius and Protogenes are celebrated amongst the painters of Rhodes, Lysippus, Chares, Polydorus, Athenodorus amongst her sculptors, and Cleobulus (one of the seven wise men), Timocreon (the scurrilous poet), Euphrates (the Aristotelian), Pametius (the philosopher), and others amongst her writers. Her school of rationalism was very famous, and the rhodian or serenissin of ancient geographers passed through Rhodes. The island produced also many celebrated athletes. The existing city dates for the most part from the period of the Knights' occupation.
after they had obtained the sovereignty of the sea. The only rule that we know now, although the entire code was adopted by the Romans under Antoninus Pius, is the principle of general average: 'If a cargo be jettisoned to lighten the ship, all cargo good and bad is insured for the benefit of all.' The medieval naval law of the Rhodians was not of Rhodian origin. It consisted of four distinct parts, of very different dates, but mostly of practical value.

Rhodium (syn. Rh, at. wt. 104, sp. gr. 12·1) is one of the metals of the platinum group. It is a white, very hard metal, resembling aluminium rather than silver. It fuses less easily than platinum. It is ductile and malleable when pure and after fusion, and insoluble in all acids; but when alloyed in small quantity with platinum, copper, bismuth, and lead it dissolves with them in aqua regia. It usually forms about one-half per cent. of the ore of platinum, from which it is extracted by a somewhat complicated process. Three oxides, two sulphides, and a chloride of rhodium have been obtained and examined by chemists. The chloride unites with several soluble chlorides to form crystallisable double salts, which are of a rose colour (whence the name rhodium, from the Gr. φόδος, 'a rose'). The metal was discovered in 1803 by Wollaston.

Rhododendron (Gr., 'rose-tree'), a genus of trees and shrubs of the natural order Ericaceae, having ten stamens, a very small calyx, a bell-shaped or somewhat funnel-shaped corolla, and a capsule splitting up through the dissepiments. The buds are small and nearly allied genera, e.g. Azalea (q.v.), are scaly and conical. The species are numerous, they have evergreen leaves, and many of them are of great beauty both in foliage and in flowers. A few small species are natives of continental Europe and of Siberia; but the greater number belong to the temperate parts of North America, and to the mountains of India. R. maximowiczii, so designated when the far larger Indian species were unknown, is common in Britain as an ornamental shrub. It is a large shrub or small tree, which forms impenetrable thickets on many parts of the Alleghanies Mountains, and is conspicuous in appearance when in flower. The leaves are large, oblong, acute, stalked, leathery, dark green and shining above, rusty brown beneath. The flowers are large, in umbellate corymbs, varying in colour from pale carmine to lilac. This species is quite hardy in Britain at an altitude of 10,000 feet. A very similar species, with narrower and more pointed leaves, which are of the same colour on both sides, a native of western Asia, and apparently also of the south of Spain. R. Catawbiense, a native of the southern parts of the Alleghanies, with large purple flowers; R. Canescens, the name of which indicates its origin; and R. arboreum, a native of Nepal, with very dense heads of large scarlet flowers, and leaves 4-6 inches long, attaining in its native country a height of 30 or 40 feet, are also fine species, and will soon grow to considerable height. Many of the extremely numerous varieties now common in our gardens and shrubberies have been produced from them by hybridising or otherwise.—Many splendid species of rhododendron were discovered in the Himalayas, the Khasia Hills, and other mountainous parts of India, by Dr Hooker and others, and many of them have been introduced into cultivation. In Europe, R. Falconeri is described as in foliage the most superb of all, the leaves being 18 or 19 inches long. It is a tree 30-50 feet high, with leaves only at the extremities of the branches. It grows in eastern Nepal at an altitude of 10,000 feet; R. subifolium has flowers 4½ inches long, and equally broad, clustered, and very beautiful. R. Maddeni, R. Aucklandii, R. Edgeworthii, and others have white flowers. R. Duthoitianum is remarkable as an epiphyte, growing on magnolias, laurels, and oaks. It is a slender shrub, bearing from three to six white lemon-scented bells, 4½ inches long, at the end of each branch. R. Nuttallii has fragrant white flowers, said to be larger than those of any other rhododendron. All these belong to the Himalayas. In more southern latitudes, as on the Neillgherry Hills and on the mountains of Ceylon, R. nobile prevails, a timber-tree 60 to 70 feet high, every branch covered with a blaze of crimson flowers. R. Keyseri and R. Thibaudianum, also natives of the north of India, have flowers with nearly tubular corolla. R. ferrugineum and R. hirsutum are small species, shrubs from 1 to 3 feet in height, natives of the Alps, and among the finest ornaments of alpine scenery. They are called Alpenrose (Alpine Rose) by the Germans. They have small carmine-coloured flowers in umbellate clusters. The mountain-slopes glow with their blossoms in July and August. The flora of the Himalayas contains a number of similar small species. R. anthropogon and R. setosum, dwarf shrubs with strongly-scented leaves, clothe the mountains in eastern Nepal, at an elevation of 12,000 feet and upwards, with a green mantle, brilliant with flowers in summer. R. nivea is the most alpine of woody plants, spreading its small woody branches close to the ground at an elevation of 17,000 feet in Sikkim. R. lapponicum, a profligate shrub, with small flowers, grows as far north as human settlements have reached in Europe, Asia, and America. Some of the species of this genus possess narcotic properties. An oil obtained from the buds of R. ferrugineum and R. hirsutum is used by the inhabitants of the Alps, under the name Otto di Marmotta, as a remedy for pains in the joints, gout, and stone. R. chrysanthum, a low shrub, with golden yellow flowers, a native of Siberia, is also used in gout and rheumatism. R. einaubariinum, a Himalayan species, poisons goats which feed upon it, and when used for fuel causes inflammation of the face and eyes. But the flowers of R. arboreum are eaten in India, and Europeans make a palatable jelly of them.

Rhodope, the ancient name of a mountain-chain (7,774 feet) extending along the borders of Macedonia and Thrace. The Turks call it Despod Yahusi, the Bulgarians Despotku Dagh, both titles having reference to the numerous (Greek) monasteries that stud its sides. Of these the most famous is the vast fortress-monastery of Rilo, in the north-west of the range, standing on its southern side in the midst of magnificent pine
forests. Rhubarb has for generations been the focus of the national Bulgarian church and the mainstay of Bulgarian nationality. See *Fortnightly Review* (April 1891).

**Rhonda Valley**, in Glamorganshire, South Wales, is noted as a centre of coal-mining and for its fine scenery. The railway connecting the whole valley directly with Swansea through the tunnel of Blaengwytte was opened in 1890.

**Rhône** (Lat. Rhodanus), the only important French river which falls into the Mediterranean, takes its rise in the Swiss Alps, on the west side of Mount St Gothard, at an altitude of 5752 feet, and not far from the sources of the Rhine. Its entire length, from its source to its mouth in the Gulf of Lyons, is 304 miles, and the area of its river-basin 38,170 sq. m. It first runs in a south-westerly direction through the canton of Valais, along a narrow valley between the Bernese and the Pennine divisions of the Alps, until near Martigny it takes a sudden turn to the north and pours its waters into the Lake of Geneva (q.v.). It issues from the lake at its southern extremity, proceeding west, and then forces a passage through the Jura. The municipality of Geneva has taken advantage of the strong and steady current of the river where, passing through the city, it is divided by an island into two arms, to utilise it for industrial purposes. A system of 20 horse-power has been constructed in a building in the bed of one of the arms, at a cost of £235,000; and by this means, in 1890, 220 motors with some 1600 horse-power were at work. Formerly the river used to disappear for some distance near Port ELéctra into the subterranean channel La Porte du Rhône; but the vault or covering of the gorge into which it plunged has now been blown away by blasting agents. At St Génis the Rhone turns back suddenly to the north-west, and then once more flows westwards through a more level country as far as Lyons, where it is joined by its largest tributary, the Saône (253 miles long), from the north. From Lyons it follows a southern direction past Vienne, Valence, Montélimart, Avignon, and Arles, where begins its delta, embraced between two main arms, the Greater and the Lesser Rhone. Its most important affluents are, on the right, the Ain, Saône, Ardeche, and Gard; on the left, the Arve, Isère, Drôme, and Durance. From Lyons southward the Rhone is easily navigable for good-sized vessels; but the up-navigation, owing to the rapidity of the current and the sudden shifting of sandbanks, is attended with considerable difficulty, and is at times almost impracticable. On account of these and other obstructions, which are greatest near the mouths of the river, communication with the Mediterranean is in great part dependent upon canals. Canals likewise connect the Rhone with the Rhine by the Saône, with the Seine, the Loire, and the Garonne.

**Rhône**, a department of France, part of the former Lyonnais, has an area of 1077 sq. m. and a pop. (1891) of 900,737 (741,470 in 1881). It lies almost wholly in the basin of the Rhone and the Saône, its eastern boundary being formed by these rivers. The surface is almost entirely hilly, being broken up in all directions by low spurs of the Cevennes. Corn, potatoes, wine, and fruits are the principal products. Nearly one-half the area is cultivated in wheat, one-eighth in vineyards, one-ninth under forest, and nearly one-sixth meadows. Some 13 million gallons of wine are made annually. The department is industrially one of the most important in France; all the branches are carried on at Lyons (q.v.), a city of the department, Armentières, Lyons and Villefranche. See also BOUCHEs-DU-RHôNE.

**Rhubarb** (Low Lat. rheubarbarum, from Gr. rhoeion barbactor, literally 'the plant which penetrates', so called because it was formerly thought to have a rhoeion, or radish, in its root; but this is not definitively known what species of rhubarb yields the valued rhubarb of commerce, which comes from inland parts of China or Chinese Tartary. The bulk of it reaches Europe now direct from China, but the best, in limited quantities, is brought through Russia. It is commonly known in Britain as Turkey Rhubarb, because it was formerly brought by way of Asiatic Turkey.

The leaf-stalks of rhubarb contain an agreeable mixture of citric and malic acids, and when young and tender are much used, like apples, for tarts and various kinds of preserves. A kind of wine may also be made of it. For these purposes different kinds of rhubarb and now very extensively cultivated in Britain, and in other temperate and cold countries. A number of species have been introduced into cultivation for their leaf-stalks. The cultivated kinds, *R. undulatum*, *R. rhaponticum*, and *R. hybridum*, with endless varieties produced by the art of the gardener, all have broad, heart-shaped, undivided leaves, and the leaf-stalks flattened and grooved on the upper side. The leaf-stalks are often also of a reddish colour, which in some of the finest varieties pervades their whole flesh. Rhubarb is cultivated on a most extensive scale by market-gardeners. It is forced in winter and early spring by being placed in pots within houses, or by having pots inverted over it, and dung and straw heaped around; and forced rhubarb is more tender and delicate than that which grows in open air. The stalks when blanched are much less harsh in taste and require less sugar to be rendered palatable. It is largely grown also in many parts of the United States.
The well-known medicinal R. officinale differs considerably in appearance from what is found in the wild. The petals are nearly round, and the under side of the leaf is covered with small, erect hairs. The numerous varieties of commercial rhubarb may be thrown into two groups: (1) Asiatic Rhubarb—Chinese, passing under the names Russian, Muscovy, Turkish, Canton, or East Indian, Batavian or Dutch rhubarb, yielded, probably by R. officinale and a variety of R. palmatum; Siberian, by R. rhaponticum; Himalayan large, by R. emodi, and small by R. webbiamum; Bokharan or Bokharian. The European, or proper species, R. Rhasb. English, by R. rhaponticum and R. officinale; French, by R. rhaponticum, compactum, and undulatum; Austrian (Moravian), by R. rhaponticum. R. palmatum is believed to produce some of the best Russian rhubarb. Whether R. officinale occurs in Shan-lai and Szechwan, from which provinces the true rhubarb is chiefly obtained and sent to Hankow, is not definitely known. The export of rhubarb from China (the so-called Turkey Rhubarb) has largely increased of late years. The average shipments of the four years ending with May 1890 is 32,000 lb., and the average prices range from 3. 4d. to 5s. 6d. per lb. It is lighter and less active than the imported rhubarb, and has been often pronounced worthless; but, according to Dr Watt, this is owing to the fact that an inferior variety reaches the plains. The whole sour stems are eaten both stewed and raw, while the leaves of this and other species are dried and smoked in Tibet and in the Eastern Himalayas.

Rhubarb is not individually mentioned now in the official trade returns, but is included with "unnamed drugs." Since 1870, when the imports were 1,135 lb., and the average prices ranged from 3s. 4d. to 5. 6d. per lb., the supplies have increased and prices have fallen by one-half. The production of English grown rhubarb root now amounts to about 12,000 lb. annually, of which from three to four thousand pounds are exported.

Chemically, rhubarb consists of mastic, oxalate of lime, an albuminoid containing nitrogen and sulphur, crystalline resins, tannin, gallic acid, sugar, chrysophane (decomposable into chrysophanic acid and glucose), rheotannic acid, and emodin.

Rhubarb may be briefly described as a cathartic, an astringent, and an antidiarrhoeal. It is chiefly used in the treatment of many infantile diseases attended with imperfect digestion and irritation of the intestinal canal. In adults it is serviceable in chronic diarrhoea and dysentery, when it is expedient to thin out the juice. It is also a useful aperient in convalescence from exhausting disease, as being free from the risk of overacting; and, for the same reason, it is a useful medicine for persons who are constitutionally liable to over-purgation from trivial causes.

Rhuddlan, a decayed town of Flintshire, North Wales, on the Chwyd, 3 miles S.S.W. of Rhyl. It was formerly a castle, built 1091, and dismantled after its capture by the Roundheads in 1646, was the scene of the betrayal of Richard II. by Percy (1399); at the march of Morda Rhuddlan, across the river, Offa defeated Caradoc (795). With Flint, &c., Rhuddlan returns a member to parliament. Pop. 1242.

Rhus. See Sumach.
RHYL, a watering-place of Flintshire, North Wales, at the mouth of the R. Clwyd, 6029.

A mere fishing-village so late as 1830, it has fine sands, a promenade pier 705 yards long, built in 1867 at a cost of £17,000, an esplanade, an aquarium and winter garden, a dozen hotels, bathing places, &c.; and, though the country around is flat, it contains the old town of Rhuddlan.

Pop. (1851) 1563; (1851) 6029; (1851) 6491.

Rhyne, or, more properly, Rime (the former spelling being merely due to a confusion with the Greek rhythm), is itself a native Tentonic word; A.S. rim, leol, rimne, Ger. reim, and O.H. Ger. rim (which itself is like rim with the special accent of Gr. ῥήμα), or the English rime, and the English rime (the latter is a mere form of the word in other northern tongues as well as in the Romanic) meant simply a poem, a numbered or versified piece (compare Lat. numeri, numbers, versus, stanzæ); but it has now come to signify that which is the most prominent mark of versification in all these tongues—viz. the recurrence of similar sounds at certain intervals. As there may be various degrees and kinds of resemblance between two syllables, there are different kinds of rime. When words belonging to the same consonant have Alliteration (q.v.), which was the prevalent form of rime in the earlier Tentonic poetry, as in Anglo-Saxon. In Spanish and Portuguese we find employed a peculiar kind of rime called Assonance, consisting in the coincidence of the vowels of the corresponding syllables, without regard to the consonants; this accords well with the character of these languages, which abound in full-toned vowels, but is ineffective in English and other languages in which consonants predominate. In the Middle English and Modern English, the French, the Italian and the Greek, the vowels of the corresponding syllables are not used for the purpose. In English there is chiefly the use of the end-syllables of different lines, they are not unfrequently used within the same line, especially in popular poetry:

And then to see how ye 're neglect'd,
How hee'd, and cry'd, and disrepeck'd.

When two successive lines rime they form a complete; three form a triplet. Often the lines rime alternately or at greater intervals, forming groups of four (quadraune) or more. A group of lines containing all the varieties of metre and combinations of rime that occur in the piece forms a section called a stave, sometimes a stanza, often, but improperly, a verse. In the days of elaborate Acrostics (q.v.), verses constructed in shapes, and other conceptions of the French, the French, the Italian and the Greek, the vowels of the corresponding syllables are not used for the purpose. In English there is chiefly the use of the end-syllables of different lines, they are not unfrequently used within the same line, especially in popular poetry:

The advantages of rime," says Guest, "have been felt so strongly that no people have ever adopted an accentual rhythm without also adopting rime. The Greek and Latin metres of the classic period, depending upon time or quantity, and not upon accent, were able to dispense with the necessary of rime; but, as has been well observed by French (Introduction to Sacred Latin Poetry), even 'the prosodic poetry of Greece and Rome was equally obliged to mark this (the division into syllabics or stresses) for the sake of the stanzæ and lines, in a different manner. Thus, adactyl and spondees were allowed to be promiscuously used throughout the hexameter line, no satisfying token would have reached the ear to indicate the close of the verse; and if the hearer had been left in doubt as to the close of the line it would have been almost impossible for him to recover it. But the fixed dactyl and spondee at the end of the line answer the same purpose of strongly marking the close as does the rime in the accentuated verse; and in other metres, in like manner, licences permitted in the beginning of the line are excluded at its close, the
motives for this greater strictness being the same.' It is chiefly, perhaps, from failing to satisfy this necessary condition that modern unrhymed verse is found unsatisfactory, at least for popular poetry; and it may be doubted whether it is not owing to the classical prejudices of scholars that our common English blank verse got or maintained the hold it has.

The objection that rhyme was 'the invention of a barbarian nation to set off wretched matter and lame metre,' rests mainly on ignorance of its real history. It cannot be considered as the exclusive invention of any particular people or age. It is something human, and universal as poetry or music—the result of the instinctive craving for well-marked recurrence and sound. The oldest poems of the Chinese, Indians, and Arabs are rhymed; so are those of the Irish and Welsh. In the few fragments of the earliest Latin poetry that are extant, in which the metre was of an accentual, not quantitative kind, there is a manifest tendency to terms of similar sound. This native tendency was overrided for a time by the importation from Greece of the quantitative metres; yet even under the dominance of this exotic system rhyming verses were not altogether unknown; Ovid especially shows a liking for them:

Quot column stallas, tot habet Rex Roma puella;

and in the decline of classicality they become more common. At last, when learning began to decay under the invasions of the northern nations, and a knowledge of the quantity of words—a thing in a great degree the basis of metre, and requiring to be learned—to be lost, the native and more natural property of accent gradually reappeared as the ruling principle of Latin rhythm, and along with it the tendency to rhyme. It was in this new vehicle that the earlier insight sought to convey their new ideas and aspirations. The rhymes were at first often rude, and not sustained throughout, as if lighted upon by chance. Distinct traces of the adoption of rhyme are to be seen as early as the hymns of Hecyra (died 368), and the system attained its greatest perfection in the 12th and 13th centuries. In refutation of the common opinion that the Latin hymnologists of the middle ages borrowed the art of rhyme from the Teutonic nations, Dr Guest brings the conclusive fact that no poem exists written in a Teutonic dialect with final rhyme before Offa's death was followed by Frankish about 870. Alliteration had previously been the guiding principle of Teutonic rhythms; but after a struggle, longer protracted in England than on the Continent, it was superseded by end-rimes.

See the articles Alliteration, Blank Verse, Hexameter, Measure, Ode, Poetry, and Sonnet; also Guest's History of English Rhymes (ed. by Professor Skeat, 1882), where the whole subject is learnedly and elaborately treated; Trench's Sacred Latin Poetry (1864); F. Wolf, Lateinische, und französiche Schiller (1814): and Schipper's Enghche Metrik (Bon, 1881-89).

Rhymer. See Thomas the Rhymer.

Rhyney, a town of Monmouthshire, on the river Rhyney (running to the Bristol Channel near Cardiff), 24 miles W. of Tredegar. It is the seat of ironworks. Pop. (1861) 7630; (1891) 7738.

Rhynechella. See Brachyopoda.

Rhyncophora. See Weevil.

Rhynehops. See Skimmer.

Rhyolite. See Lepidote.

Rhy, John, was born near Ponterwyd in Cardiganshire, June 21, 1840, served a paril- feeship under a Welsh bishop, was at Bangor Normal College kept a school in Anglesey down to the end of 1865, when he entered Jesus College, Oxford. He was elected to a fellow-ship at Merton in 1869, and next continued his studies at the Sorbonne, Heidelberg, Leipzig, and Göttingen, returning in 1871 to become inspector of schools for Flint and Denbigh. In 1872 he was appointed professor of Celtic in the University of Oxford, and in 1881 was elected a fellow, and in 1893 principal of Jesus College. His Lectures on Welsh Philology (1877) and Celtic Britain (1882) confirmed a reputation already gained. In 1890 Kuhn's Beiträge zur vergl. Sprachforschung, the Rete Celtique, and the Archæologica Cambrensis. He gave the Hibbert Lectures on Celtic Heathendom in 1886, and at the close of 1889 the Rhiadn Lectures at Edinburgh. Professor Rhyys is a contributor to the present work.

Rhythm may be defined as measured or timed recurrence of sounds, in order that a number of parts may constitute a pleasing whole, a certain relation or proportion must be felt to pervade them, and this exemplified in the arrangement of matter into visible objects, as in sculpture, architecture, and other plastic arts, produces a rhythm which is usually called symmetry. Rhythm applied to the movements of the body produces the dance. 'The rhythmic arrangement of sounds not articulated produces music, while from the like arrangement of articulate sounds we get the cadences of prose, and the measures of verse.' The rhythm and verse may be hence considered as a succession of articulate sounds, regulated by a rhythm so definite that we can readily foresee the results which follow from its application. Rhythm is also met with in prose; but in the latter its range is so wide that we never can anticipate its flow, while the pleasure we derive from verse is founded on this very anticipation.'

The rhythm of verse is marked in various ways. In Greek and Latin, during their classic periods, quantity, or the regulated succession of long and short syllables, was the distinguishing mark of verse. In the languages developing from these the rhythm depends upon accent. The recurrence of similar sounds, or rime, is also used, along with accent, to render certain points of the rhythm more distinct, as well as to embellish it. See Metre, Rhyme.

Rhytina, a genus of Sirenia, akin to the dugong and manatee, of which only one species is known—the Rhytina stelleri, discovered by Belcher and the naturalist Steller when they were wrecked on Behring Island in 1741, and described very fully by Steller. At that date they were extremely plentiful in this part of the northern Pacific, but were soon almost exterminated, the Russian hunters and traders. Nordenskiöld's inquiries led him to believe that individuals were seen till the middle of the 19th century. The species was distinguished by its large size, sluggishness, and its having horny plates in place of teeth. The skin was rough and hairy. The Vega expedition brought home many skeletons.

Riad. See Wahabis.

Riazan, a town of Russia, and capital of a govern- ment, stands near the right bank of the Oka, 115 miles by rail SE. of Moscow. A straggling, ill-built town of wooden houses, it sends wheat to Moscow. Pop. 30,107.

Ribalta, Francisco (1550-1625), and Juan (1597-1628), painters of the school of Valencia.

Ribble. See Preston.

Ribbon, Riband, or Ribband (a Celtic word). The principal ribbon manufacturing centre in Cov- entry is in the district containing Coventry and Belleile abroad, as also, more recently, the middle Rhine. Ribbons were also formerly made in Derby and Leek. In Coventry the ribbon industry was commenced
by Bird at the beginning of the 18th century. Coventry was at that time a city of 12,817 inhabitants. The population increased with the progress of the ribbon industry, and in 1809 it was 41,698. In 1890 there were 58,866 looms; but in 1893 not one-third of this number was employed, and the number is much less now. In 1861 there were 40,600 people dependent upon the ribbon trade, in 1881 not more than a fourth. The ruin and migration of the Cranberry industry from the causes—first, strikes, particularly the great one of 1869; second, the French treaty of 1860, before which this branch was protected by a duty of 15 to 30 per cent. The great competition of Basel and St Étienne then soon ruined the production of Coventry. To this could be added, the lower price, the finer quality, the cheaper, the hours of work longer, and taste and style superior, particularly at St Étienne. Crefeld, Moscow, and especially Paterson in New Jersey, are also manufacturing centres. Amongst the various kinds of ribbons woven in Coventry are the following: Taffeta, gros-grain, twill, satin, satinet, ottoman-satin, and terry, plush, brocade, faille, plaids, watered satins, birthday ribbons, and book-markers, sauretats, orientals, waistbands, and other plain and figured narrow fabrics. Of the narrow kind the principal is the gros-grain, gros-grain is a ribbed silk; plush, a variety of pile surface; satin, a smooth polished surface, &c.; and there are mixtures of these various fabrics, generally woven in stripes, faille with satin, satin with terry, velvets with satin, plain and figured in conjunction, making an infinite variety of decorative effects both in weaving and colour.

The construction of the fabric of a ribbon is like that of broad silks viz. the threads or warp (Fr. chaîne) lengthwise; those at right angles, or shot across the warp are called the weft (Fr. traverse). The warp consists of many threads, the whole of which interweaves the warp of one, or at most a few only, according to the number of colours or style of fabric required. There are two kinds of looms or methods of weaving, hand-loom and power-loom, the latter having gradually but surely superseded the former, except for very artistic work. These two looms have also of two kinds, those which weave plain goods and those which weave figured or patterned work. The latter are called Jaquard looms (see Weaving); in these every warp-thread is so isolated as to be under mechanical control, and each, independently of every other thread. These warp-threads are raised by means of the ‘harness’ to allow of the shuttle to pass between the whole or parts of the warp-threads according to the pattern or style required. The harness is composed of ‘leashes,’ the purpose of which is to raise at will the warp-threads, each of which requires one leash. The term ‘shel’ is applied to the warp when separated horizontally by the harness for the shuttle to pass between; this is called the ‘opening,’ that in the upper surface being termed the top shed, and the lower part the bottom shed. The shuttle contains the quill in which has been wound the ‘filling,’ which is a portion of the shuttle or weft-thread, and is propelled in the shuttle between the warp-threads by hand or by other power, generally steam-power. In front of the opening there is often the ‘slay’ or ‘reed,’ which is a comb-like apparatus through which the warp-threads pass before they receive the shuttle into its resting-place in the fabric. The Jaquard arrangement is placed on the top of the loom, which indicates the position of the requisite machinery to work them. See Silk.

Ribbon-fish, a name given to several genera of Acanthopterous fishes having the body much compressed and band-like, the dorsal fin extending the whole length of the back, the anterior rays being long and distinct, the skeleton soft, and the skin naked and silvery. They are true deep-sea fishes, and are widely distributed, though nowhere abundant. Some authorities divide them into two groups—the Trachypteridae, having long ventral fins, and the Regaleonidae, with short ventral fins represented by single, oar-like filaments. The best-known species is Regaleon banksi, the Dealfish (q.v.).

Ribbonism, the name assumed by a group of secret associations among the lower classes in Ireland throughout the half century extending from 1820 to 1870, at its greatest height from about 1855 to 1855. It began in 1825, and it was sandwiched among several others that were wrapped in obscurity, but it appears in the beginning at least to have been political in its aims, and O’Connell’s opinion seems most probable, that it grew out of the northern Defenders who banded themselves together as the Orange organisation. Earlier associations with somewhat similar objects were the Whiteboys and the Threshers, and, in particular corners of the island, the Carders, Shanavasses, and Caravats.

Ribbonism, according to O’Connell, was more political in its aims, inasmuch as the organisation of the Orange lodges; in the south it was rather into what he characterised as ‘driftless acts of outrage.’ Although everywhere condemned by the Catholic clergy, it included none but Catholics within its numbers, and it maintained its influence by a system of oath-taking and secrecy, and so on.

Of these many were made known to the authorities by informers, but they were found to contradict completely rather than merely differ from each other. One striking feature of Ribbonism, as distinguished from most Irish patriotic associations, was the fact that its adherents belonged exclusively to the very lowest and most ignorant classes, the humbler peasantry, farm-servants, labourers, and petty shopkeepers, hardly even the smallest farmers or their sons apparently belonging to it in any part of Ireland. So far as there was any unity in its aims, it aimed at making itself a political force in all agrarian questions; but, as A. M. Sullivan pointed out, the Ribbonism of one period and of one district was not the Ribbonism of another. In Ulster it professed to be a defensive or restorative organisation against the actions of the Orange Lodges. In Munster it was at first a combination against tithe-proctors. In Connaught it was an organisation against rack-renting and evictions. In Leinster it often was mere trade-unionism, dictating by its mandates or threatening by its vengeance the employment or dismissal of workmen, stewards, and even domestics. This latter phase generally preceded the disappearance of the system in a particular locality, and was evidently the lowest and basest form to which it sank or reverted.

The name, which of course originated in a green badge worn by the members, does not appear to have been attached to it till about 1826; and its influence seems to have grown gradually till about 1830, from which time it began rapidly to decline before a body of official and non-official lukewarm political intelligence that recognised the greater advantage of more open and legitimate agitation. Here and there traces of a demoralised Ribbonism survived, capable of an occasional outbreak into a malignant crime, but its declaration as illegal by the Westminster Act of 1871 was hardly better than a mere fogging of the bowels of the state.

See W. Stewart Trench, Realities of Irish Life (1868), and A. M. Sullivan, New Ireland (1877).

Ribéauville (Ger. Rappoltsweiler), a town of Upper Alsace, pleasantly situated amid vineyards at the mouth of the Voges, 33 miles SSW. of
Strasburg. Excellent wines are made; cotton and calico goods are manufactured, and there are numerous flour, oil, and saw mills. Pop. 59,002.

Ribera, JUSEPE, called SPAGNOLETTO ('Little Spaniard'), was born at Jativa, near Valencia, on 12th January 1588, and died at Naples in 1656. He studied a few years with Francisco Ribilta at Valencia, then crossed the sea and continued his studies in Rome, Parma, and Modena. He settled in Naples, where he adopted the boldness of Caravaggio's style, and became the ablest painter among the naturalists. His treatment of subjects was based on a vigorous, but generally coarse, representation of nature, in opposition to that formed on the study of conventional or academic rules. He attracted the attention of the viceroy, became court-painter, and was elected member of the Academy of St Luke in Rome in 1630. His realism is forcible and generally gloomy: he delighted to represent horrible and gruesome subjects, such as the martyrdoms of SS. Bartholomew, Januarius, and Lawrence, 'Prometheus,' &c. Salvador Rosa and Giordano were his most distinguished pupils. He executed several etchings marked by force and freedom.

Ribes (from Arab. riba), a genus of shrubs belonging to the natural order Ribesiacceae, familiar examples of which are the Gooseberry and the Cur- rant of gardens. The species are chiefly natives of the temperate and colder regions of the northern hemisphere; some are found at high elevations in tropical America and on the Pacific coast, from California to Chili. They are found also on the mountains of Northern India, in the colder regions of Africa and Europe, but western America is the home of the largest number of the species. They are twining shrubs, often, as in the Gooseberry (R. grossularia and R. speciosa), armed with spines, clothed with deciduous alternate leaves, usually palumbly lobed. The flowers are axillary in racemes, rarely solitary—small but often showy in the mass, as in R. speciosa and R. sunguineum, the former a native of California, often to be met with trained to walls in British gardens; the latter, enjoying a wide range in the northern United States, is also a very popular shrub in British gardens, well known under the name Scarlet or Flowering Currant. The calyx is the most conspicuous organ of the flower. It is persistent or adhering after it has shed its stamens, a feature very familiar in the gooseberry. The fruit is a berry, not in all species succulent, as in the gooseberry, currant, and others, but sometimes, as in R. sunguineum, almost entirely pulpless when ripe.

The most important product of the genus is the fruit, which consists of sweet mulglage mixed with malic and nitric acid along with an astrignonent substance. The gooseberry, the Red Currant (R. rubrum), and the Black Currant (R. nigra) are natives of Britain—that is, they find a place in the British flora, though there are authorities who doubt whether they are truly indigenous, being rather disposed to think that where they are found wild they are merely escapes from cultivation. They have, however, been cultivated in British gardens for centuries, and the fact that they attain to higher perfection as fruits in Britain than in any other country—their excellence—has been noticed in the British provinces and Spain, although the plant is well known, the fruit is always inferior owing to the greater warmth of the climate—is strongly in favour of the presumption that the plants are indigenous to Britain (see CURRANT, GROSSULARIACEAE). The fruit of R. grossularia is a drupe, and the several berries of others, natives of North America, are pleasant to eat and have similar properties to those ascribed to the gooseberry and currants.

Rib-grass. See Plantain.

Ribbs are elastic arches of bone, which, with the vertebral column behind, and the sternum or breast-bone in front, constitute the osseous part of the walls of the chest. In man there are twelve ribs on each side. The first seven are more directly connected through intervening cartilages with the sternum than the remainder, and hence they are termed vertebro-ster nal or true ribs; while the other five are known as false ribs, and the last two of these, from being quite free at their anterior extremities, are termed floating ribs. A glance at a skeleton, or at a plate representing the articulated bones, will show that the ribs vary very considerably both in their direction and size. The upper ribs are nearly horizontal, but the others lie with the anterior extremity lower than the posterior; this obliquity increasing to the ninth rib, and then slightly decreasing. They increase in length from the first to the eighth, and then again diminish. The spaces between the ribs are termed the intercostal spaces. On examining a rib taken from about the middle of the series we find that it presents two extremities (a posterior or vertebral, and an anterior or sternal), and an intervening portion, termed the body or shaft. The posterior extremity presents a head, a neck, and a tuberosity. The head is marked by two concave articular surfaces divided by a ridge, the lower facet being the larger. These surfaces fit into the cavity formed by the junction of two contiguous dorsal vertebrae, and the ridge serves for the attachment of a ligament. The neck is a flattened portion proceeding from the head; it is about an inch long, and terminates at an eminence termed the tuberosity or tubercle, from whence the shaft commences. On the lower and inner part of this tubercle is a small oval surface, which articulates (as shown in fig. 2) with a corresponding surface on the upper part of the transverse process of the lower of the two vertebrae with which the head is connected. The shaft presents an external convex and an internal concave surface. A little external to the tubercle the rib is bent to form the angle, from
which point the rib passes forwards and outwards, ultimately curving inwards to join its costal cartilage. The upper border of the rib is thick and rounded, while the lower border is marked by a deep groove, which lodges the intercostal vessels and nerve.

The ribs of Mammals are mostly connected, as in man, with the bodies of two vertebrae, and with the transverse processes of the posterior one. In the Monotremata, however, they articulate with the vertebral bodies only; while in the Cetacea the posterior ribs hang down from the transverse processes alone. Their number on each side corresponds with that of the dorsal vertebrae. The greatest number, twenty-three, occurs in the two-toed sloth, while in the Cheiroptera eleven is the ordinary number. In Birds each rib articulates by means of a small head with the body of a single vertebra near its anterior border, and with the corresponding transverse process by means of the tubercle. Moreover, each rib possesses a ‘diverging appendage,’ which projects backwards over the next rib, so as to increase the consolidation of the thoracic framework, necessary for flying. The dorsal vertebrae here never exceed eleven, and are commonly seven or eight in number, and the ribs proceeding from them are connected with the sternum not by cartilage, as in mammals, but by true ossous sternal ribs, which are regularly articulated at one end with the sternum, and at the other with the termination of the spinal ribs. In the Chelonia Reptiles the ribs (as well as the vertebra and the sternum) deviate remarkably from the normal type, the lateral parts of the carapace consisting mainly of anchylosed ribs united by dermal plates. In the Crocodiles there are only twelve pair of true or dorsal ribs; while in the other Saurians, and in the Ophidians, the ribs are usually very numerous. In the Frogs there are no true ribs, the reason probably being that any bony element in their thoracic walls would interfere with the enormous thoraco-abdominal enlargement which these animals periodically undergo at the breeding period.

In the language of the comparative anatomist, a rib is to be regarded as a Pleurapophysis—one of the elements of a typical Vertebrum (q.v.).

Fracture of the Ribs is a very common surgical accident, resulting from blows or falls upon the chest. Ribs may, moreover, be broken by mere pressure, as when persons are severely crushed in a crowd; and instances are on record in which, in the case of aged persons, the ribs have been actually fractured in violent coughing. The treatment consists in the application of a broad flannel roller round the chest, so tightly as to prevent, as far as possible, all movement of the ribs, and to render the respiration abdominal rather than thoracic. The handiage must be prevented from falling in and in order to prevent the shoulder-blade from moving, and thus disturbing the broken ribs, some surgeons confine the arms to the side of the body. If one or both of the extremities of the fractured rib should perforate both layers of the pleura and wound the lung, or in rare cases when only the parietal layer of the pleura is injured, if the skin is also perforated, air may escape in the act of inspiration from the lung or from the exterior into the pleural cavity, and thence through the wound in the costal pleura into the cellular or areolar cavity of the trunk, giving rise to Empysema (q.v.), in the form of a soft puffy swelling that crepitates and yields under pressure.

Ricardo, David, an eminent political economist, was born in London, 19th April 1772. His father was a Jew, a member of the Stock Exchange, and brought up his son to the same business. An alienation took place between them, when in 1793 young Ricardo married out of the Jewish persuasion and conformed to the Christian religion. He continued, however, to follow his father's profession with such success that at a very early age he realised a large fortune, while preserving an honorable reputation throughout his career in business.

In 1790 Ricardo had his interest in political economy awakened by the perusal of Smith's Wealth of Nations. His experience, as his biographer tells us, fitted him for the treatment of the special class of economic questions connected with banking and finance, and it was in the discussion of them that he first made his mark. In 1808 he brought out a pamphlet entitled The High Price of Bullion a Proof of the Decompensation of Banknotes. From the indications of the banknotes, it was an argument in favour of a metallic basis. Other successful pamphlets followed. In 1817 appeared the work on which his reputation as an economist chiefly rests, On the Principles of Political Economy and Taxation. It is not a complete treatise on political economy, but may be described as a discussion of some of the principal factors of the science, such as value, wages, rent, &c. Ricardo is the conspicuous example of the abstract method of political economy. He was very deficient in the philosophic and historical training necessary for the wider investigation of economics. He approached the subject as a member of the Stock Exchange; and the economic conditions which he contemplated were those prevalent in his own day in England and in countries similar to it, namely, that of a great city. The main gist of his work is to embody economic principles in formulas, which for the most part have a general validity relative to the limited conditions which he thus assumed. His theories of Rent (q.v.) and of Wages (q.v.) have a general truth when regarded in this way; but when considered from a wider historical and philosophic standpoint they shrink greatly in significance. His theory of Value (q.v.) is still more defective.

In 1819 Ricardo entered parliament as member for Portarlington, and retained his seat till his death at Gatecomb Park, Gloucestershire, on 11th September 1823. He was too dilluent to be an effective speaker, but his speeches, especially on matters of trade and finance, which he had made
particularly his own, always commanded respect, and had a very considerable influence. Personally he was highly esteemed. His method in political economy is now almost universally abandoned. Even the strongest supporters of the traditionary school of political economy that the formulas have been greatly overrated, and must undergo continual limitation, modification, and correction in the light of experience and of historic conditions. Yet his theories are eminently worthy of study, both as a phase in the development of economic sciences as illustrations in the stage of the development of economic facts. The collected works of Ricardo were edited by M'Culloch (1846), and his Letters to Malthus were published in 1857.

Ricasoli, Baron Bettino, Italian statesman, was born at Florence, 9th March 1809, and studied at Pisa and Florence. He was one of the best agriculturists in Italy, wrote books on the cultivation of the vine, the olive, and the mulberry, and for ten years worked successfully at the drainage of the Tuscan Maremma (q.v.). In 1859 he took a prominent part in opposing the government of the grand-duke of Tuscany (ITALY), and when the latter fled Ricasoli was made dictator of Tuscany. He laboured with great energy for the unity of Italy, and when that end was accomplished was by Victor Emmanuel appointed governor-general of Tuscany. On the death of Cavour (see) in 1861 he took his place at the head of the ministry; but his government was undermined by Rattazzi, and he resigned in March 1862. Ricasoli returned to power in June 1866, but was again obliged to retire in April of the following year. At the same time he withdrew altogether from public life; he died in Rome, 23rd October 1886. Ten volumes of his letters and papers were published in 1886-94. See Life by Gotti (1894).

Ricci, Matteo, founder of the Jesuit missions in China, was born at Macerata, 6th October 1552, studied at Rome, and in 1583 obtained leave to settle at Chow-King. He made his headquarters at Se-eronga, but was ultimately compelled to retreat to Peking, where he built a church. He so mastered Chinese as to write dialogues and other treatises which received much commendation from the Chinese literati, and met with extraordinary success as a missionary. At his death, 11th May 1610, he was universally mourned. See JESUITS, Vol. VI. p. 314.

Ricci, or Rizzo, David. See Mary Queen of Scots.

Rice (Oryza), a genus of grasses, having panicles of one-flowered spikelets, with two very small pointed glumes, the florets compressed, the palea strongly nerved, awned or awnless, six stamens, one germen, and two feathery stigmas. The Greek name oryza, was probably derived from an Arab or Persian word akin to the Sanskrit viriti, a word which passed into Arabic as ariza or ariza, whence the Spanish form arroz. The only important species is the Common Rice (O. sativa), one of the most useful and extensively cultivated of all grains, supplying the principal food of nearly one-third of the human race. It seems to be originally a native of the East Indies, but is now cultivated in all quarters of the globe, and almost wherever the conditions of warmth and moisture are suitable. It is adapted to tropical and subtropical climates, and can be cultivated on former margin; and requires much moisture, rather, however, in the soil than in the air. Rice is an annual, varying from 1 to 6 feet in height. There are many other distinguishing characteristics of the varieties in cultivation, some having long awns and some being awnless, some having the chaff (patina), when ripe, yellow, white, red, black, &c. The seed or grain of rice grows on little separate stalks springing from the main stalk; and the whole appearance of the plant, when the grain is ripe, may be said to be intermediate between that of barley and wheat. It requires a moist soil, sometimes flooded; and the cultivation has in many places been attended with an increase of intermittent fevers and of general ill-healthiness. It is introduced as being artificially flooded at certain seasons. In some parts of the East canals are carried along the sides of hills for the irrigation of land for the cultivation of rice. In South Carolina rice is sown in rows in the bottom of trenches, which are about 16 inches apart; the trenches are filled with water to the depth of several inches, till the seeds germinate; then the water is drawn off, and afterwards the fields are again flooded for rather more than a fortnight to kill weeds. They are flooded again when the grain is near ripening. In Europe the cultivation of rice is most extensively carried on in the plains of Lombardy and in Valence in Spain. Marshy situations, where there is always the same abundance of water, are not so suitable for rice as those in which the supply of water is regulated according to the season and the growth of the plant. The best of all rice known in the market for size and quality is that of Carolina, yet the introduction of rice into the United States took place only about the middle or close of the 17th century; for the date has been disputed, 1694 being the earliest year in which it is known to have been grown. Rice in the buck is called Paddy in India. The wild forms are of the marshy tropical countries of southern Asia, as well as in northern Australia, is without doubt the plant from which all our forms of cultivated rice have been derived. Most modern authors regard India as the first home of rice, though some say it was originally derived from China. It has been cultivated in India from time immemorial. At the Calcutta Exhibition of 1884, 4000 apparently distinct forms of Bengal rice were shown, arising from differences of climate and varieties of soil. There are 1400 different specimens of rice in the Calcutta Museum. There are as many as 1500 names of rice, and though very many of these are merely local synonyms, a large number unquestionably correspond to intrinsic and seasonal distinctions. The obvious differences in the grain itself are indeed very remarkable. In colour the specimens range from a bright golden hue through almost every gradation of tint to black; and in regard to size also they vary greatly. But all these forms of rice are referable to a very few well-marked and constant varieties of O. sativa, the result of seminal variation commonly observed in plants that have been long bred and cultivated. The rice exported from India is divided broadly into three qualities—(1) table rice; (2) ballam, named after the boats in which it is carried; and (3) monkey, common or inferior rice. Cargo rice is that in which only one part in five is hanked. In British India these are more than 60 million acres under rice; in Ceylon,
RICE

605,000 acres; and in Cochin-China, 2 million acres. It is also extensively grown in Siam, China, Japan, Java, Egypt, and Brazil. In 1890 India exported 34,590,000 cwt.; China, 9,500,000 cwt.; Japan, 4,700,000 cwt. The production in the United States has fluctuated much. In 1860 it was 187,140,173 lb.; in 1870, 73,635,071; in 1880, 110,131,173. In 1890, 388,912 lb. were exported, and 113,308,571 lb. were imported. After South Carolina the principal rice-growing states are Georgia and Louisiana. Great Britain imports about 6,000,000 tons annually, mainly from Burma; of this half is re-exported.

In China rice is generally sown very thickly on very wet land, and afterwards transplanted to the land which it is finally to occupy. The plants tiller or spread at the root very much, so that each sends up several or many stalks. The rice-grains are carefully kept clear of weeds, although often so wet that a man cannot walk in them without sinking to the knees. In many parts of China and in other countries it is common to obtain two crops of rice in a year.

Rice is husked and quickly dried before being brought to market. Special milling machinery is required for removing the inner skin of the rice grain, and a large quantity of the grain is broken by the process, being used only as broken rice or rice flour. Good Indian rice has the following composition: Moisture, 13.50 per cent.; nitrogenous matter, 7.41; starch, 78.10; fatty or oily matter, 0.40; ash, 0.56. Rice contains a small quantity of niacin and phosphates and other elements. Rice is not used as extensively in the United States as it is in China. Rice flour is used in the manufacture of many food products: bread, crackers, pastas, and desserts.

Rice in the diet of a typical American family today includes rice as a staple food. Rice is a versatile and nutritious grain that can be enjoyed in a variety of dishes, from simple steamed rice to flavorful rice pilafs and risottos. It is a rich source of carbohydrates, which provide energy, and also contains small amounts of protein, fiber, and vitamin B complex. In the United States, rice is produced in several states, with the majority of rice being grown in the southern region. The most common types of rice grown in the United States are long-grain and short-grain rice. Both types are consumed in the United States, with long-grain rice being more common in the southern regions, while short-grain rice is popular in the northern states. Rice is also exported from the United States, with China being one of the largest importers.

RICHARD I.

703

7 to 8 feet high, with broad diffuse leaves, and a large terminal panicle of male flowers, with a spike of female flowers at the summit. The flowers have six stamens. The seeds are about half an inch long, slender, and angular, affording very good meal, and are much used by the Indians where the plant abounds.

Rice, James, novelist, for nine years collaborator with Mr. Walter Besant (q.v.), was born at Northampton in 1843, studied at Cambridge, drifted from law into literature, and became proprietor and editor of Once a Week. He died in London, 25th April 1882.

Rice-bird, a name given to the Bob-o-link (q.v.), as also to a popular cage-bird, the so-called Java Sparrow (Padda oryzivora), really a kind of finch.

Rice-paper, a paper made in China with layers of Fatsia japonica, a tree peculiar to the island of Formosa. The pit is sometimes 1 to 1 1/2 inch in diameter. By carefully cutting this pit spirally with a very sharp knife it is opened out into a sheet of snowy whiteness. When the paper is then removed the whitening, by flattening in a press, is ready for use. The largest sheets cut are by 10 inches. It is chiefly used for making coloured drawings on. When dyed it can be made into the most perfect artificial flowers, more natural than can be produced from any other paper or fabric.

Rich, Edmund, See Edmund (ST).

Richard I., king of England, surnamed Cœur de Lion, was the third son of King Henry II. and his wife Eleanor of Aquitaine. He was born on 8th September 1157, either at Oxford or at Woodstock, but was brought up amongst the knights and troubadours of Poitou, in Aquitaine, with which country his mother's marriage, he was whilst still a child invested by his father. In England Richard did not spend in all his life a full twelvemonth; after he became king he spent only twenty-six weeks in his kingdom, seventeen weeks when he landed to take the crown and to go through the coronation ceremony at Westminster, and nine weeks when he came back from his imprisonment. It may indeed reasonably be doubted whether he could speak English. A favourite of his unprincipled mother, he was indifferently reared by her confidante, Geoffrey of Brionne, and by Geoffrey in their rebellion (1173) against their father (see Henry II.). Henry II. had his eldest son, Prince Henry, crowned king as his successor during his own lifetime; and in 1183 he ordered that his younger brothers should do homage to him. Richard obeyed with the greatest reluctance; thereupon the ungrateful Prince Henry at once picked a quarrel with him, and marched an army into his dukedom of Aquitaine. King Henry hastened to the assistance of the young duke, whilst the other brother Geoffrey sided with the prince. But the sudden sickness and death of the ingrate put an end to the quarrel. In the spring of 1189 Richard was in his turn in arms against his father. Philip of France, the pertinacious foe of King Henry, mingled in the strife; and eventually Richard joined forces with his father's enemy, did homage to him, and took the field against the old king. A reconciliation was rendered more difficult because of Richard's jealousy of John, his father's favourite.

Richard had the title of King of Jerusalem, Duke of Normandy, and Count of Anjou on 5th July 1189, and was crowned king of England on 3d September following. But he had already taken the vows of the crusader; and, besides his coronation, he had another object in coming to England: he wanted to raise funds for his crusade. He effected this
latter purpose in a brief space of time by selling whatever he could get a purchaser for. About midsummer 1190 he met Philip of France at the rendezvous, Vezelay in France; but from Lyons he made a very bad roads; Philip took him to Messina in Sicily. Both kings spent the winter at that city, and their mutual jealousy caused within a hair's-breadth of a rupture. The throne of Sicily had just been seized by the Norman Tancred, an illegitimate son of King Roger, though the lawful heir, William, still claimed the crown. Frederick Barbarossa, and afterwards the Emperor Henry VI. Moreover, Tancred detained in custody Johanna, widow of the late king (William the Good) and sister of Richard, together with her very large dowry. But he made his peace with Richard by giving up to him his sister and her possessions, and by betrothing his little daughter to the boy Arthur (son of Richard's dead brother Geoffrey), whom Richard now declared to be his heir. On his way to Palestine in the spring of 1191, part of the fleet of the English king was driven on to the island of Cyprus, and the crews were most inhospitably treated by the reigning sovereign, Isaac Comnenus, a nephew of the emperor of Byzantium, who had revolted from his liege lord. Richard sailed back from Rhodes, routed Isaac in battle, deposed him, and gave his crown to Guy of Lusignan. In Cyprus too he resolved Benjamin or Baladin, whom his mother had brought to him at Messina. At last, on 8th June, the English king landed near Acre, and shortly afterwards that stronghold surrendered, the siege having lasted two years. Richard took his full share of the jealousies, animosities, and disagreements, though not of the treacheries, that made the Christian crusading host a hotbed of commotion. The glorious exploits of Richard the Lion-hearted—his march to Joppa along the seashore, his approach upon Jerusalem at Christmastide, meeting the formidable force in Palestine, his second advance in the summer of 1192 on Jerusalem (the city he never beheld), and his relief of Joppa—made his name ring throughout the East and excited the wonder and admiration of Christendom, but brought no increase of revenue. His victories in September concluded a peace with Saladin for three years, three months, and three days, and in his impulsive, impatient way started off home alone, without waiting for his army and fleet. A storm shipwrecked him near the north end of the Adriatic, where he lingered for three months, and made his way through the dominions of his bitter enemy, the Archduke of Austria. He was recognised, seized, and handed over to the Emperor Henry VI. (March 1193). The emperor demanded a heavy ransom for his release, but promised to give him the kingdom of Arles in addition to his liberty. Richard's loyal subjects raised the money; and greatly to the chagrin of Philip of France and Richard's brother John, the captive king returned home (13th March 1194). In England in the meantime Longchamp (q.v.) had made himself so unpopular that Richard generously forgave him and made him a present of 100,000 marks, and appointed him in his place Walter of Cortances, Archbishop of Rouen. It was John, however, who exercised the greatest power in the realm. And although he used his utmost endeavours to prevent Richard's return from his captivity, yet Richard generously forgave him the 100,000 marks which Longchamp had previously paid in punishments, raising what money he could, making arrangements for the governance of the kingdom, and being crowned again—the emperor is said to have forced his captive to resign his crown and take it back as a thief of the empire—Richard proceeded to France, and spent the rest of his life there, warring against Philip. England was governed in his absence by Hubert Walter, Arch.
the subsidy on wool for life, and delegated all its authority and power to a commission of eighteen members, all supporters of the king. Richard soon aroused the slumbering discontent of his subjects by two acts of legislation: first, a prohibitory act, principally by means of forced loans, and by his arbitrary and despotic rule. In the beginning of 1398 the Duke of Norfolk and the Duke of Hereford (Henry, son of John of Gaunt) were accused to the king of having spoken treason against him. Richard immediately rode amongst his subjects, exclaiming he would be their leader, and granted them the concessions they asked. The risings in the other counties speedily collapsed when the people learned what the king had done; but during the autumn serious punishments overtook them. Seven thousand in all are said to have perished in the fighting and on the scaffold. The causes of this wide-spread and simultaneous uprising on the part of the mass of the rural population may be summarised as follows: there had been long continuance of heavy taxation; the villeins represented the reposition since the Black Death of personal services, and were anxious to become tenants of their little farms at a fixed rental; the free tillers of the soil had formed themselves into associations to defeat the Statute of Labourers (1351), which fixed the wages of the commoners; the Lollard or Wyclifite preachers were denouncing the idleness and vices of the regular clergy, and they and others (as John Ball) were promulgating social doctrines calculated to make the common people discontented with their lot and hostile to the idea of the country clergy complained of the tyranny of the church; the mismanagement of the war, and the incapacity and selfishness of the court party provoked much discontent; there were many discharged soldiers in the country, and these, and others, were sinking to a level. But from the fact that the insurgents directed their enmity against himself and the advisers of the king, John of Gaunt saw that he could never hope to succeed in his ambitious schemes in England; and from this time he kept himself in the background, until in 1383 he carried himself and his restless plottings to Spain and Gascony. Richard in 1390 made him Duke of Aquitaine for life. In 1383 Richard invaded Scottland, and took Edinburgh and burned it; but, not encountering the Scots, returned home. About the same time were the complaints of the country clergy, headed by Thomas of Woodstock, Duke of Gloucester, began to oppose the king and his chosen friends. They impeached several of them before the Merciless Parliament (1388), and secured convictions and executions. But on 5th May 1389 Richard suddenly declared himself of age, and proceeded to govern on his own responsibility. For eight years he ruled as a moderate constitutional monarch, and the country enjoyed peace—hostilities with France were not renewed after 1388—when he declared himself himself King Henry IV. Richard's first wife, Anne of Bohemia, whom he had wedded in 1382, died, and two years later he married Isabella, daughter of Charles VI. of France, a girl of eight. From that time he seems to have adopted very largely French tastes, manners, and ideas. About the same time it was said that Richard began to assert the pretensions of an absolute monarch. On 8th July he had Gloucester, Arundel, and Warwick arrested on the charge of conspiring against the crown. Arundel was beheaded; Gloucester was sent a prisoner to Calais, and died there in prison, probably murdered, a fortnight after his arrest; and Warwick was banished to the Isle of Man. Thomas Arundel, Archbishop of Canterbury, was also banished. In the following year an obsequious parliament granted to the king

When the young monarch assured them he would grant their requests, and take measures to liberate the villeins from bondage and to commute their personal services into fixed money rents. The men of the same year another condition of the labourers of London's palace, burning Temple Bar, opening the prisons, and breaking into the Tower and slaying the Archbishop of Canterbury, met the king at Smithfield (15th). During the negotiations, William Walworth, the mayor of London, struck down Wat Tyler (v. the battle of Borough). The country clergy, the king immediately rode amongst them, exclaiming that he would be their leader, and granted them the concessions they asked. The risings in the other counties speedily collapsed when the people learned what the king had done; but during the autumn serious punishments overtook them. Seven thousand in all are said to have perished in the fighting and on the scaffold. The causes of this wide-spread and simultaneous uprising on the part of the mass of the rural population may be summarised as follows: there had been long continuance of heavy taxation; the villeins represented the reposition since the Black Death of personal services, and were anxious to become tenants of their little farms at a fixed rental; the free tillers of the soil had formed themselves into associations to defeat the Statute of Labourers (1351), which fixed the wages of the commoners; the Lollard or Wyclifite preachers were denouncing the idleness and vices of the regular clergy, and they and others (as John Ball) were promulgating social doctrines calculated to make the common people discontented with their lot and hostile to the idea of the country clergy complained of the tyranny of the church; the mismanagement of the war, and the incapacity and selfishness of the court party provoked much discontent; there were many discharged soldiers in the country, and these, and others, were sinking to a level. But from the fact that the insurgents directed their enmity against himself and the advisers of the king, John of Gaunt saw that he could never hope to succeed in his ambitious schemes in England; and from this time he kept himself in the background, until in 1383 he carried himself and his restless plottings to Spain and Gascony. Richard in 1390 made him Duke of Aquitaine for life. In 1383 Richard invaded Scottland, and took Edinburgh and burned it; but, not encountering the Scots, returned home. About the same time were the complaints of the country clergy, headed by Thomas of Woodstock, Duke of Gloucester, began to oppose the king and his chosen friends. They impeached several of them before the Merciless Parliament (1388), and secured convictions and executions. But on 5th May 1389 Richard suddenly declared himself of age, and proceeded to govern on his own responsibility. For eight years he ruled as a moderate constitutional monarch, and the country enjoyed peace—hostilities with France were not renewed after 1388—when he declared himself himself King Henry IV. Richard's first wife, Anne of Bohemia, whom he had wedded in 1382, died, and two years later he married Isabella, daughter of Charles VI. of France, a girl of eight. From that time he seems to have adopted very largely French tastes, manners, and ideas. About the same time it was said that Richard began to assert the pretensions of an absolute monarch. On 8th July he had Gloucester, Arundel, and Warwick arrested on the charge of conspiring against the crown. Arundel was beheaded; Gloucester was sent a prisoner to Calais, and died there in prison, probably murdered, a fortnight after his arrest; and Warwick was banished to the Isle of Man. Thomas Arundel, Archbishop of Canterbury, was also banished. In the following year an obsequious parliament granted to the king
he married Anne, the younger daughter of War- 
wick the King-maker, who had been betrothed to 
the Duke of Buckingham. The alliance of the 
greatly resented by Clarence, who had married, 
the elder sister, and wished to keep all of War- 
vick's vast possessions in his own hands. Clarence 
quarrelled too with King Edward, who in 1478 
procured his impeachment by parliament. The 
refusal of鸾he Duke to come in private to the 
Tower on 18th February. Of this judicial murder 
Gloucester is likewise accused; but the evidence 
for his complicity is very slight. In 1482 he was 
put in command of the army that invaded Scot- 
lund. Along with the Duke of Albany he entered 
Edinburgh, and was called the Wrecker of 
Scotland. To quill the great garrison of 
Richmond at length landed at Milford Haven 
on 7th August 1485. Richard met him at Bosworth 
in Leicestershire on the 22d, and there lost his 
kingdom and his life, fighting bravely like a king, 
crown on head, in the midst of his foes (see HENRY 
VII.). The body of the slain king was subjected 
to great indignities, carried to Leicester, and there, 
after being exposed for two days, was buried in 
the Grey Friars churchyard.

Richard's was a strangely mixed character. Its 
ruining passion was an inordinate craving for power, 
which at some time or other gratified itself in 
bloody, reckless, and unscrupulous, and hence 
heinous. He possessed many of the typical 
qualities of the best of the Plantagenets—a skilful 
soldier, of great ability and energy, brave, bold, 
and不顾 of consequence, fond of display, yet not 
incapable of nobler impulses. Had he been born 
the lawful heir to the throne, and succeeded 
to it peacefully, he would probably have been a 
great king; for he was a very capable ruler, 
which the real welfare of his subjects, 
not the court. He was also swayed by a lively sense of divine justice; his generosity to his subjects had its 
foundations in his nature to the upper hand; and these grew 
and hardened as time went on, till his audacity 
and unscrupulousness were matched with a cunning 
and hypocrisy such as are seldom found united in 
one man. On the other hand, he unquestionably 
had a great charm of manner, and knew how to 
influence confidence even in those who had the best 
reasons for distrusting him. He was liberal too, 
and, where his own personal ambition was not 
directly concerned, just and generous. He was 
also swayed by a lively sense of divine justice; 
the court. He was also swayed by a lively sense of divine justice; his generosity to his subjects had its 
foundations in his nature to the upper hand; and these grew 
and hardened as time went on, till his audacity 
and unscrupulousness were matched with a cunning 
and hypocrisy such as are seldom found united in 
one man. On the other hand, he unquestionably 
had a great charm of manner, and knew how to 
influence confidence even in those who had the best 
reasons for distrusting him. He was liberal too, 
and, where his own personal ambition was not 
directly concerned, just and generous. He was 
also swayed by a lively sense of divine justice;
Richard de Bury, see Aungerville.

Richard of Cirencester, an early English chronicler, whose life falls between 1335 and 1401. His name is found in 1355 in the list of monks of the Benedictine monastery of St Peter, Westminster. In 1391 he obtained a license from his abbot to visit Rome, and he died in 1401. The only known work of this extant contemporary is a translation in four books, the Speculum Historiale de Gestis Regum Angliae 1447-1600, edited for the Rolls series by Professor J. E. B. Mayor (2 vols. 1863-69). It is of some independent value for the history of Westminster Abbey and Edward the Confessor and even so late as 1868 we find it in a connection with the notorious forgery, De Situ Britanniae, long accepted, to the serious detriment of history, as an authoritative work on the antiquities of Roman Britain. This work was first printed in 1578 by its ingenious author, John Charles, but in 1850 by the reprint of 1854. Gibbon gives it a diligent study of the life of Edward the Confessor, and the chief interest of the work is its excellent translation, which is clear and concise, and in a flowing style.

Richard of Cornwall, second son of John, king of England, was born on 5th January 1200. In 1225-26 he and his uncle, William of Salisbury, came to the assistance of the pope and the next year he received Cornwall, as the result of a rising of the earls to compel the king (Henry III.) to make provision for him. He managed his money matters well, and his wealth, as well as his prudence, saved Henry in many an impending crisis. For some years he acted with the English barons, to many of whom he was closely related by his marriage with Isabel, Countess of Gloucester, daughter of the Earl of Pembroke. In 1232 he was one of the leaders in the opposition to Hubert de Burgh, and in 1233 he headed an armed rising provoked by the king's secret marriage of his sister to Simon de Montfort. But Richard was still heir to the throne, and the articles which Henry was prepared to sign, and which dismissed his foreign advisers, appeared to the earl to bind the king's hands too closely. He acted to secure his safety; and in 1240-41 Richard was away on a crusade, and the next year he was with his brother in Gascony; and in 1244 he married Sanchia of Provence, sister of Queen Eleanor, and this second marriage drew him away from the government. In 1252 he refused the position of the king's second son and went to Sicily; but in 1257 he was elected by a majority titular king of the Romans, and was soon afterwards crowned at Aix-la-Chapelle; and he was skilful enough to maintain a certain hold on Germany, lavishing his wealth to maintain his own position and the dignity of the empire. In the great struggle which took place between Henry III. and his nobles Richard at first acted as a peacemaker. Subsequently, however, he sided with his brother against Simon de Montfort, and he was imprisoned at Lewes, and imprisoned for a year, until the battle of Evesham (1265) set him free. In 1267 he was a third time married, to Beatrix, niece of the Elector of Cologne. Richard died at Kirkham, 21 April 1272, a most devoted and hearted loving father to his eldest son, Henry, who was murdered at Viterbo by the Montforts, and immortalised by Dante. Two other sons died also without issue.

Richards, Brinley, pianist and composer, was born at Carmarthen in Wales in 1819, the son of a church organist. He began to study music at the Royal Academy in London about 1835, and on the completion of his studies had won a good position in London as a pianist and teacher of music. He was for many years a professor of the Royal Academy. His compositions for sacred and part songs and for the pianoforte won great popularity, especially his 'God Bless the Prince of Wales.' Richards bestowed much attention upon the study and encouragement of Welsh music. He died on 1st May 1885.

Richarson, Sir Benjamin Ward, M.D., L.L.D., F.R.S., physician, author, and inventor, was born at Somerby, Leicestershire, 31st October 1826. He studied at Anderson's College, Glasgow, took the diploma in 1850 of the faculty of Physicians and Surgeons, and graduated in medicine at St Andrews in 1854. He was a frequent contributor to the Medical Times and Gazette, and gained the Fothergillian gold medal for an essay on 'Diseases of the Fetus in Utero,' and the Astley-Cooper prize of 300 guineas in 1856 for an essay on the 'Congestion of the Blood.' Dr Richardson's medical inventions include a double-valve inhaler for chloroform, an ether spray tube, apparatus for embalming, a mask for workers in dust, a lethal chamber for painless extinction of the life of lower animals, &c. He invented various new anaesthetics, and discovered the controlling property of amyl over tertian. He wrote and lectured on total abstinence, public health, and many medical and scientific subjects, and popularised many facts in sanitary science. He founded the Journal of Public Health in 1855 and published it monthly until 1862, and a quarterly journal, entirely written by himself, The Aseptic, in 1861 and 1884 onwards. In 1868 he was presented with 1000 guineas and a microscope by 600 of his medical brethren and friends. He was knighted in 1893, and died 21st November 1896. See his autobiographical Vita Medica (1897).

His published works and essays are numerous, including Cause of the Congestion of the Blood (1856); Alcohol, its Action and its Use (1860); Contour Lectures on Wine and Its Alcohol (1876); Hygiene, A Monthly City of Health Drinking (1879); A Review of the Life and Work of Edwin Chadwick (2 vols. 1887); Common Health (1887); National Health, or the Life of the People (1891).

Richardson, Charles, lexicographer, was born in July 1775, studied law, kept school at Clapham, received in 1832 a pension of £257, and died October 6, 1865. His first work, Illustrations of English Philology (1815), led to his undertaking an English dictionary for the Encyclopedia Metropolitana, the first volume of which appeared in January 1818. The project fell through, but Richardson's New Dictionary of the English Language at length appeared complete in two quarto volumes in 1837. The work was warmly
received—Trench styled it 'the best dictionary in the language'—and at that time it deserved the praise. A later work was entitled On the Study of Language: an Exposition of Pope's Definitions of Poetry (1834).

Richardson, Sir John, naturalist, was born at Dumfries, November 5, 1737, studied at Edinburgh University, became a 'Master', and, as one of the 'imitators', principles as his variety to in familiar Leaser Mv tenacity that 'Ikj 1740, a beautiful agreeably neltlKxI conspicuously too. Life this his the his the common He literary of Sirley afterwards came a master-piece of 1854 or the his the curious characteristics fellows motto • In 1719 Richardson, a diligent artless accidently for a newspaper, by perfecting in (1729; 1829-37) the Ichthology of the Voyage of H.M.S. Erebua and Terror (1844-48). There is a Life by the Rev. John M'gruir (1868).

Richardson, Samuel, novelist, was born in 1689 in Derbyshire. Like Matthew Prior, he was the son of a joiner; but unlike him, he made no effort to obscure his origin. My father,' he said, 'was a carpenter, and from this humble origin fell a distinguished note. My mother was also a good woman, of a family not ungentled.' His career is a curious exemplification of the truth of that Horatian precept which Thackeray chose for the motto of Esmond. It preserved to the end the chivalry of the eighteenth century, and bordered on the sentimentality of the earlier days of the century. In the life of the novel, the hero sometimes looks like a 'silent and loving shadow' on his character, and is afterwards the moralist of Salisbury Court was as a boy the 'Gravity' and 'Serious' of his schoolfellows; the novelist who penned the incomparable epistles of Clarissa and Harriet Byron was as a youth the favoured and indefatigable amanuensis of half the girls in the neighbourhood, acquitting himself in this artless office something of that strange knowledge of the minuter mechanism of the feminine mind which is so conspicuous a feature of his genius. He says of himself that he had only 'common school learning; ' but he appears to have been at Christ's Hospital. In 1706, at the age of sixteen, he was bound by his own wish to John Wilde of Stationers' Hall, a printer, with whom he served the usual period. Allington Wilde, whose daughter he married, was also a printer, but was quite distinct from his master. From 1715 to 1719 he was employed in the 'Government journal' of the House of Commons. In the latter year he opened an establishment of his own in the centre, and later in the north-west corner (No. 11) of Salisbury Square, then Salisbury Court. His printing-office and warehouses were in Blue Ball Court, on the east side of the Square. In a solange of six years he continued to prosper, perfecting his faculty for letter-writing in various ways, and serving the humbler needs of literature by diligent compilation of prefaces, indexes, advertisements, and the like. He printed more than one newspaper, and by the favour of Mr Speaker Onslow obtained the printing of the journals of the House of Commons, twenty-six volumes of which passed through his establishment. Then, in 1740, came the opportunity which transformed him into a literary celebrity. To use his own words, 'he accidentally slid into the writing of Pamela.' He was over fifty when two bookselling friends invited him to prepare a volume of familiar letters 'in a common style, on such subjects as might be of use to those country readers who were unable to indulge for themselves.' He caught at the idea, superadding another. 'Will it be any harm,' he said, 'in Pamele you want to know, if it should instruct them how they should think and act in common cases?' Hence sprang Pamela, published in November 1740. Its title was as leisurely as its method: 'Pamela; or Virtue Rewarded.' The scenes of familiar letters from a beautiful young damsel to her parents. Published in order to cultivate the principles of virtue and religion in the mind of the youth of both sexes. A narrative which has its foundation in truth; and at the same time that it agreeably entertains by a variety of curious and affecting incidents, contains delicately developed ideas, which, in too many pieces calculated for amusement only, tend to inflame the minds they should instruct.' The moral note is explicit enough on the good printer's title-page; but for all that Pamela is by no means ad usum Delphini. Its vogue, in a coarser and rollicker age than ours, was nevertheless extraordinary. Not to have read of Richardson's exemplary heroine was as 'great a sign of want of curiosity, as not to have seen the French and Italian dancers.' Divines extolled her from their pulpits; Pope declared she would do more good than the Triton of Ulysses, that prohibited her popular chronicles at times of amusement; and in remote country villages, when at last she was happily married, her rustic admirers set the bells a-ringing. In February followed a second edition; a third succeeded in March, and a fourth in May. M. Voltaire, in a letter to Richardson, declares this unexampled popularity, lastly put together for sequel a Pamela in High Life, which had the unfortunate effect of seducing Richardson into two supplementary volumes, now deservedly forgotten; and then Henry Fielding flirted the Salisbury Court device, and, producing what Richardson and his coterie regarded as the 'lew and ungenerous engratment' of Joseph Andrews. Happily, however, both for Richardson and posterity, he speedily discarded burlesque for the immortal character of Parson Abraham Adams.

Eight years elapsed before Richardson published another novel. But during this time, consoling himself for the coarse satirical of the irreverent by the 'soft adulation' of a little circle, chiefly of the gentler sex, who gathered round him in his suburban home at Hammersmith, he continued, either in his snug writing-closet or his summer-house, to work placidly at his masterpiece—Clarissa; or the Adventures of a Young Lady, known generally as Clarissa Harlowe. Virtue, in this performance, was not 'rewarded,' but ruined. The heroine is nevertheless drawn with a tenacity of insight to which there are few equals. The hero, Sebastian, the chief male character, that of Lovelace, though more of an abstraction, is scarcely inferior. Johnson declared the book to be the first in the world for its knowledge of the human heart; and even Fielding did not refuse his tribute: 'Such simplicity, such manners, such deep penetration into nature, such power to raise and alarm the passions, few writers, either ancient or modern, have been possessed of.' (Jasobite Journal, No. 5). Lesser voices swelled the chorus with greater energy, and it was repeated across the Channel with Gaillie enthusiasm. The high-priest of sentiment, Diderot, did not scruple to name its author with Homer and Euripides; and as if to prove that this was no momentary Anglomania, in our own day the poet Alfred de Musset proclaimed it to be 'le premier roman du monde.' But from France also came its compactest condemnation. 'In nature,' said D'Alembert, 'est bonne à imiter, mais non pas jusqu'à l'ennui.'

Having drawn the ideal woman in Clarissa, Richardson proceeded, some five years later, to portray, in Sir Charles Grandison, the perfect man of the modern age. He could not do this with greater ability than Pamela, but still far below Clarissa. It has, moreover, no central story strong enough to reconcile the reader to the prolix impeccability of its superb hero, whom M. Taine, with an unavowed burst of critical levity, suggests should be stuffed and canonicalised for his incomparably good qualities. Besides a solitary essay in Johnson's
Raméter (No. 97), and the voluminous but not very interesting correspondence (published with an excellent memoir) by Mrs Barland in 1894. Richelieu left no other literary remains of any importance. In later life a nervous habit grew upon him, which terminated in 1671 by a fit of apoplexy, of which he died. He has left his own portrait in his great biographer, Lady atcough (Cavendish, foil iv. 290); but it might almost have been deduced from his letters. He was a sentimental, purring, methodical, well-meaning little man, domesticated and affectionate, whose fitting environment was feminine society of the sympathetic sort; and he lived the life of a courtier, with which his worshippers tempered the wind of adverse criticism to his sensitive soul by depicting their sex in return with a patience, a discrimination, a sustained analysis of secret spring and motive which it has been given to no other male author, living or dead, to achieve the personal and the vocal testimony to his native genius that his impracticable method of telling his story by correspondence, and his intolerable circumstantiality and diffuseness (he thinks nothing of an epistle of fifteen pages, and Clarissa takes nineteen for her will) have only served to make the reader guess, to evade emphasis and intensify the reality of his creations.

A reprint of Richardson's novels, with an admirable preface by Mr Leslie Stephen, was issued in 1883. The essays of Mrs Oliphant (Blackwood, March 1869), of Mr Burford (Manchester Review, Oct. 1877, and Contemporay, xiv.), and of Mrs Andrew Lang (National Review, xiv.) all deserve the attention of the student.

Richborough. See Sandwich.

Richelieu, Armand Jean Duplessis, Cardinal, Duc de, one of the greatest statesmen of France, and, with only a black mark to his name, the most illustrious family of Richelieu, 12 miles SSE. of Chinnon, September 5, 1585. He abandoned a military career for the church, in order to keep in the family the bishopric of Luçon, to which he was consecrated at twenty-two. Representative of the Poitou clergy at the States-General in 1614, he attracted the notice of the queen-mother, and rose in 1616 to be secretary at war and foreign affairs; but the downfall of Marshal d'Ancre, the queen-regent's favourite, in April 1617, sent him back to his monastic life in August. As queen-mother and the young king were reconciled, partly through the agency of the celebrated Capuchin Father Joseph—l'éminence grise—of later days, till his death in 1638 the intimate friend of Richelieu. The latter showed much tact and patience forbearance of ill manners, he profane an Alliance in the powerful Duc de Luynes, and in 1622 was named cardinal, in 1624 minister of state. This position he retained to the end of his life, in spite of countless court intrigues, and ere long the most powerful open and secret opposition from the queen, Gaston, Duke of Orleans, and a host of minor intriguers, first among whom was the too famous Duchess de Chevreuse. His first important measure was the blow to Spain of an alliance with England, cemented by the betrothal (1625) of the king's sister Henrietta with Charles, then Prince of Wales, and the Valenciennes marriage (1628) of the country of the Spanish and papal troops, but was unable to pursue his advantage, and had to submit to the terms of the peace of Monzon (1626). His next task was to destroy the political power of the Huguenots. Without the monasteries, which he conducted in person, concentrating all his energy upon the task, the great stronghold of La Rochelle was starved into submission, 30th October 1628. He next turned to crush Rohan and the Languedoc rebels, and destroyed the proud walls of Montauban, last refuge of Huguenot independence. Early in 1630 he entered Italy with a splendid army, himself in command, and soon reduced Savoy to submission. Meanwhile he plunged into dark and torious intrigues with the Italian princes, the pope, and with the Protestants of the north against the House of Austria. He promised a large subsidy to Gustavus Adolphus, and, through the masterly diplomacy of Father Joseph at the Mortefon (1628), he succeeded in persuading Ferdinand to dismiss Wallenstein. But the treaty of Cherasco (April 1631) ended the Italian war, the second gave France the important strategic position of Pinsorlo. Just before this final triumph Richelieu had successfully surmounted the greatest danger of his career, and kept France from ruin for his downfall by the queen-mother, Gaston of Orleans, the House of Guise, Bassompierre, Créqui, and the Marillac. She tried to bully the king by her violence, but Richelieu followed his master to Versailles, and again had the whole power of the realm placed entirely in his hands. So ended 'the Day of Duperes' (11th November 1630). The queen-mother fled to Brussels, Bassompierre went to the Bastille, Gaston fled to Lorraine. The cardinal was now made duke and peer, and governor of Brittany. Further intrigues and attempted rebellions by the emigrant nobles and the great city of Paris were crushed with merciless severity—Marillac and Montmorency and other nobles were sent to the block. Meanwhile Gustavus Adolphus had run his brief and brilliant course; and his death at Lützen left Europe in ruins, and with it the chance of some difficult to reckon. In July 1632 Richelieu had seized the duchy of Lorraine. He continued his intrigues with the Protestants against Ferdinand, subsidising them with his gold, but till 1633 he took no open part in the war. In May of that year, after capturing his strongholds and concluding a close alliance with Victor Amadeus of Savoy, Bernhard of Saxe-Weimar, and the Dutch, he declared war on Spain, and at once placed in the field an army of 132,000 men. But his first efforts were singularly unsuccessful, and in 1634 Piacenza was taken and in the Netherlands, entered Picardy, crossed the Somme, and threatened Paris itself. But in this hour of peril Richelieu rose to the height of his genius, and awoke a new and irresistible force as he threw himself upon the patriotism of France. With 80,000 foot and 8000 horse he surprised Tarascon out of Picardy, while his ally Bernhard drove them across the Rhine, and in 1638 destroyed the imperial army in the decisive battle of Rheinfelden, a victory which opened to him the gates of the key-fortress of Breisach. Bernhard threw the fruit of his victories into the hands of Richelieu, whose policy soon bore further fruit in the disorganisation of the power of Spain—revolts in Catalonia, and the loss of Portugal; the victories of Wolfenbüttel (1642) and Kuenpen (1642) over the Imperialists in Germany; and at length in 1641 in Savoy also in the ascendency of the French party. Another triumph that same year was the speedy collapse of the Imperialist invasion in the north by the Count of Soissons, who perished in the first battle. The failure to capture Tarascon was one among the many; and the complete triumph of the cardinal's latest years.

But the hatred of the great French nobles to his rule had never abated, and Richelieu found safety alone in the king's sense of his own helpless and impotent situation. 'There was only the safe government for France was a strong absolutism uncontrolled either by the selfish ambition of the nobles or the constitutional legalism represented by the Parlement of Paris. The last conspiracy against him was that of the Grand-quarter, the young Cix-Mars, whose intrigues with Gaston, the Duke of Bouillon, and the
Spanish court were soon revealed to the cardinal, the centre of a network of espionage which covered the whole of France. When the hour was ripe he placed in the king’s hands at Tarascon proofs of the traitorous plot with Spain, and was given full powers as Lieutenant-general of the realm. Cinq-Mars and De Thou were all three arrested, and the whole council of Grand Pension of Orleans followed after his kind to buy his own security by betraying his accomplices. Cinq-Mars and De Thou were executed at Lyons in the autumn of 1642. But the great minister was himself dying in the hour of his greatest triumphs with talk of another near him, but the strong will and fiery soul within his frail and feeble frame had thrust him aside and retained the fleeting life. He faced the inevitable at last with calm tranquillity—when the priest bade him forgive his enemies, he made answer, ‘I have never had any other enemies than the state.’

We see the same unhumble impersonality in the identification of himself with the state in his Mémoires—‘I have been severe to some in order to be good to all. . . . It is justice that I have loved and not vengeance. . . . I wished to give Gaul a face, to make her a nation. . . . I aimed at Gaul, not at her. . . . to identify Gaul with France, and wherever the ancient Gaul had been, there to restore the new.’ He died 4th December 1642, bequeathing Mazarin to the king as his successor.

Richelieu built up the power of the French crown, he achieved for France a preponderance in Europe, and throughout his life he moved onwards to his goal with the strongest tenacity of purpose, unmoved either by fear or pity. He destroyed the local liberties of France, and crushed every element of constitutional government, and his policy overthrew the empire still standing and waste places some of her fairest provinces and most thriving towns. Our judgment of him will always differ according as we examine his end or his means—the public or the private man. He never sacrificed to personal ambition the interests of his country as these seemed to himself, but he often forgot, in his methods the laws of morality and humanity. There is no need here to discuss the more fundamental question of whether his end was actually identical with the highest good of France—the best defence that even so recondite a Chauvinist as Henry VI. can offer is to point back to the full tendencies long rooted in French soil, and that no other ideal of a policy was then possible for France but a systematised absolutism under a beneficent despot. Nor have we sympathy to spare for the corrupt and selfish nobles whom he crushed with a severity so merciless that he drove twenty-one persons into exile, all of them the greatest names in France, banished sixty-five, several of these ladies, while seventy-three nobles were flung into prison, and forty-three were either beheaded or executed in pairs.

We have the face of Richelieu best from Philippe de Champaigne’s picture in the Louvre, in which the energy of the model had passed into the hand of the artist. A pale appearance, the mere ghost of a great man in Michelé’s phrase, neither flesh nor blood, but all intellect, as Quinet said of Voltaire, he possessed the same sternly and penetrating eye and that imperious gesture that overawed the king and the proudest peers of France.

The weakest point in Richelieu’s character was his literary ambition and the extraordinary pains he took to adorn the literary reputation. His own plays, for the most part written with anxiety, sleep in safe oblivion, but his Mémoires are still read with interest, forming a subtle and elaborate panegyric upon himself, so that Michelé says in his paradoxical manner, yet not without truth, ‘If one would not know Richelieu, one should read his Mémoires.’ He founded the French Academy. His Correspondence and State Papers, edited by d’Avenel, fill 8 vols. of the Collection de Documents inédits sur l’Histoire de France (1853-77).

See the article FRANCE; Capefigue, Richelieu, Mazarin, et Le Frontenac (2d ed. 1844), and De Cord, de Richelieu (1865); Dussieux, Le Cardinal, Richelieu (1885); D’Avenel, Richelieu et la Monarchie absolue (3 vols. 1834-89); Hanoix, Histoire du Cardinal, de Richelieu (1883).

Richmond, an ancient municipal borough in the North Riding of Yorkshire, on the left bank of the deep-valleyed Swale, 40 miles by a tramline NW. of York. Its Norman castle (1072-1146), now utilised for barracks, stores, &c., has a very fine banqueting-hall and a keep 100 feet high. Other buildings are the parish church (restored by Scott, 1800), with good wood-carvings, Queen Elizabeth’s grammar-school (1567; rebuilt, 1849-68); the market-house (1854); and the Perpendicular tower of a Franciscan friary, founded in 1258. The racecourse (847 feet above sea-level) commands a magnificent view. Till 1867 Richmond returned two members, and then till 1885, 4 Pop. (1851) 4106; (1881) 4264; (1891) 4107. The latter year 1891 the title of Richmond was conferred by the Conqueror on his kinsman, Alan Rufus, son of the Count of Brittany, and, coming into the possession of the crown through John of Gaunt, was granted by Henry VI. to the father of Henry VII. Henry VII. created his natural son, Henry Fitzroy (1517-36), Duke of Richmond, as Charles II. did his natural son, Charles Lennox (1672-1723), the ancestor of the present Duke of Richmond and Gordon.

See works by R. Gale (Latin, 1722), Clarkson (1821), Whitaker (2 vols. 1823), Robinson (1833), and Longstaile (1834, 1837).

Richmond, a town of Surrey, 8½ miles WSW. of London (by rail 9½ by river 16), stands partly on the summit and declivity of Richmond Hill, and partly on the level right bank of the Thames. The Terrace, stretching along the brow of the hill, commands an unrivalled prospect of hill and dale, woodland and winding stream; and one of the fairest river-views in England may be gained from Richmond Bridge, which, 100 yards long, was built in 1774-77 at a cost of £26,000. Only a gateway remains of the ancient royal palace of Sheen, where died Edward the Confessor (1066) and Henry VI. was born. The time of Richmond was conferred by Charles I. in 1631, remains. It covers 2253 acres, and its brick wall is nearly 8 miles in circumference. Scott here makes Jennie Dean have her audience with Queen Caroline. The well-known ‘Star and Garter’, which dates from 1738, was largely improved by Sir Hakewill shots in 1872-74 at a cost of £249,000; its banqueting-house escaped, built by Barry in 1865. At the parish church are buried the poet Thomson, Keats, Lady D. Beauchler, and Dr John Moore; and here, too, Swift’s Stella was baptised. St Matthew’s (1855) is a well-designed church, but the clock tower, 195 feet high; and there are also a Wesleyan theological college (1834), a free library (1881), &c.; whilst Richmond worthies other than those above mentioned have been Reynolds, Gainsborough, Collins, and Earl Russell. Market and nursery gardening are carried on a large scale. It was incorporated as a municipal borough in 1850. Pop. (1861) 7423; (1881) 19,066; (1891) 22,084. See R. Crisp’s Richmond (1866); Round Richmond (1881); and E. B. Chancellor’s Historical Richmond (1883).
RICHMOND

Richmond, (1) capital of Wayne county, Indiana, on the East Fork of Whitewater River, 69 miles by rail NW. of Cincinnati, and 68 E. of Indianapolis. It was founded by the Society of Friends and Philadelphia College for women, here, for both sexes. There are manufactures of agricultural implements, machinery, boilers, flour, &c. Pop. (1880) 12,743; (1900) 18,266.—(2) Capital of Madison county, Kentucky, 119 miles by rail S. by W. of Cincinnati. It is the seat of the Central University (1873) and the Madison Female Institute. Pop. (1900) 4653.

(3) The capital of Virginia, on the left bank of the James River (here crossed by a number of bridges), at the head of tide water, about 150 miles from its mouth, and 116 miles by rail S. of Washington. It is a port of entry, and vessels drawing 14 feet of water can come up to the lower end of the city, where there are large docks. Richmond is picturesquely situated on a group of hills, the summit of one—Snowoke Hill—being occupied by the capitol (1793), which contains valuable colonial archives and portraits; it possesses also a marble statue of Washington by Houdon, and in its grounds are statues of Henry Clay and Stonewall Jackson, and the Washington monument, a noble bronze group by Thomas Crawford. Patrick Henry was a Rector of the University, and President Monroe in Hollywood Cemetery, where also is a Confederate monument 90 feet high. Among other notable public buildings are the governor's mansion, the new city hall, custom-house and post-office, pententinty, and several alphaeta.

The chief churches are the Richmond College (Baptist; 1832) and the Virginia Medical College. The James River Falls here supply immense water-power, and in 1890 the city contained 783 manufacturing establishments, employing 21,618 hands, with a capital of $16,596,500. Among the manufacturing concerns are 21 tobacco-factories (employing 8792 people), great rolling-mills, iron-foundries, nail-works, machine- and locomotive-works, flour, meat-flour, and paper-mills, and fertiliser-works. Five railways meet at Richmond, which is a terminus also of the James River and Kanawha Canal; and there are regular steamers to New York, Philadelphia, and Baltimore. The chief exports are cotton, flour, and tobacco. Richmond was founded in 1737, and became the capital in 1779. On 26th December 1811 the burning of a theatre destroyed the lives of sixty persons, and wounded hundreds of the spectators. In 1861 Richmond was selected as the Confederate capital, and from that period was the objective point of the Union armies in the east, and defended by General Lee with a large army and formidable lines of earthworks (which eventually extended for nearly 40 miles), until the seizure of the lines of supply by Generals Grant and Sheridan compelled its evacuation, after almost a year's siege and a series of sanguinary battles, on the night of April 2, 1865. A considerable number of the Confederate generals, ministers, and members of the legislature that was held by the retreating Confederates. But in the quarter of a century that followed Richmond recovered her old beauty, and more than her old prosperity and importance. In 1888 an 'agricultural, mechanical, and tobacco exposition' was held here. Pop. (1870) 93,928; (1880) 63,690; (1890) 81,383; (1900) 85,050. See the articles McCLELLAN, GRANT, LEW, UNITED STATES.

Richmond, LEIGH, author of the Dairyman's Daughter, was born at Liverpool, 29th January 1772, and while a child was lamed for life by leaning from a wall. He was educated at Cambridge, and was appointed in 1798 to the joint curacies of Radling and Yaverland in the Isle of Wight, in 1805 to the rectory of Turvey in Bedfordshire, where he died, 5th May 1827. He wrote Fathers of the English Church and Domestic Portraiture—memoirs of his three deceased children—and in a happier hour his Dairyman's Daughter, Negro Serenades, and Young Couple, three well-knit and logical tracts which have carried his name over the world. Collected they form Annals of the Poor (1814). See the Memoirs by the Rev. T. S. Grimshawe (1828; ed. by Bishop G. T. Bedell, Phila., 1848).

Richter, JOHANN PAUL FRIEDRICH, usually known by his pen-name of JEAN PAUL (with the French pronunciation), Germany's greatest humorist, was born on the first of May (21st March) 1763, in Wunsiedel, a little town of the sequestered pine-clad Fichtelgebirge in North Bavaria. The imaginative boy was brought up in the idyllic sabbath-life of the mountain villages in which his father was pastor, went to school at the town of Hof, and in 1781 was sent to Leipzig University to study theology. But, like Lessing, he did not study theology; Rousseau and Voltaire, Swift and Sterne, Pope and Young, had much stronger attractions for him, and he too resolved to write books. He asserted his independence of custom by discarding the periwig and stiff necktie, wore his hair long, his shirt and vest open at the throat, and dressed him as he pleased. But he found it harder to get work for himself, and assert his position as an 'enamnciated' youth. Being poor, he got into debt all round, and in November 1784 fled secretly from Leipzig, to go and hide his head in the poverty-stricken home of his mother (a penniless widow since 1779) at Hof. His first book, Children and Children's were satires; but he could get no publisher to introduce them to the world, until in 1783 Voss of Berlin gave him forty louis d'or for The Greeneland Love-suits. The book was a failure. For three years Jean Paul struggled to support his mother and to feed bread, helping with the few florins he earned by his pen. He read enormously, omnivorously, and sat hours making excerpts from the books he devoured—a practice he kept up from early boyhood to old age. These many folios of closely-written materials were the storehouses upon which he drew for materials when he came to write his romances. He took long rambles amongst the hills and forests, his hair flying in the wind, a book in his hand or a song on his lips, and a favourite dog at his heels. In the beginning of 1787 he began to teach the children of different families in the district, and of course taught by original methods. All this time he still went on writing, and during his nine years of tutorship produced, amongst other things, the satirical Extracts from the Devil's Papers (1789), Faust's Journey (1796), and Freudel's Complaint (1796), the last two amongst the best examples of his satirico-humoristic writings; the beautiful idyls Dominc Wa/z (1798), Quintus Fecline (1796; Eng. trans. by Carlyle, 1827), the Parson's Jubilee (1797), the first two perhaps the most finished works by him, and among them his first novel, The Invisible Lodge (1793), Hesperus (1795; Eng. trans. 1865), and Flower, Fruit, and Thorn Pieces, or Siebenkäs (1796-97; Eng. trans. by Noel 1844 and 1871, by Ewing 1877); Campanerthol (1797; Eng. trans. 1857), a series of impromptu anonymous satires; the unperverted reverse book; and the prose lyrical idyll, My Prospective Autobiography (1799). The Invisible Lodge was his first literary success; Hesperus made him famous. In 1790 Charlotte von Kalb, perhaps the most remarkable, certainly the most advanced, woman of her age in Germany, wrote to express her admiration of the book; and a few months later, at her invitation, Jean Paul visited Weimar. There Goethe received him politely, but with cool reserve; that, too, was Schiller's attitude,
when Jean Paul went on to Jena to see him. The antagonism between them was deep and final, a titanic struggle, yet ill concealed by all three. Herder and his wife, on the other hand, greeted the young romance-writer with overflowing admiration, and gave him their friendship, which also endured till death. As for Charlotte von Kalb, she did not stop at friendship; in Spandau already, she exercised her sex’s pledged privilege of leap-year—her first letter to him was dated 29th February—and gave him unasked the love of her vehement heart.

From this time for a few years Jean Paul's life was rich in incident and full of excitement. One of the gin-stores fathers, in which he was the object of extravagant idolatry on the part of the women of Germany, especially of aristocratic damsels who dabbled in literature. They gave him their love whether or not, and would have deserted husband and children for his sake; for, though not personally handsome, Jean Paul had a wonderful fascination of manner, particularly towards women. He found all women charming, he was a delightful talker and a good listener, and had a sweet and sympathetic smile—qualities that explain a good deal. In 1800, when he was 29, he married a Berlin lady, and three years later settled down at Bayreuth, attracted by its beauties of hill and valley, and by its beer. There he spent the rest of his days, leading a simple, busy life, writing his books, playing with his children, tending his pet animals, and taking short pilgrimages to the different towns in Germany; the present of a flower filled him with perfect joy. His last years were clouded by the death of his only son, a promising student, in 1821, and by his own blindness. From 1799 he enjoyed a pension from the Prince-primate of Hessen, and then from the King of Bavaria. He died on 14th November 1823.

The principal events of his married life were the two grand romances, Titan (1800–3; Eng. trans. 1862) and Wild Oats (1804–5; Eng. trans. as Walt and Vilt, 1849). The former, accounted by himself and by most German critics his masterpiece, though Englishmen would generally prefer the latter, as they would certainly prefer Siebenkäs to Hesperus; Schmetteck's Journey to Flitz (1809; Eng. trans. by Carlyle, 1827) and Dr Katzenberger's Trip to the Spa (1809), the best two of his satirico-humorous writings; the idyll Fischer's Life (1819), the fragment of the greater grand romance, Nicholas Markgraf, or The Comet (1820–22); a series of reflections on Literature (Vorschule der Ästhetik; improved ed. 1812), containing many excellent things about poetry, humour, wit, style; another series on Education (Lehrsam, 1807; Eng. trans. 1848, 1876, and 1887), a book that ranks with Rousseau's Émile as a standard work on training the young, and is full of everlasting wisdom; various patriotic writings (1808–12); and an unfinished Autobiography (1826), the finest of all his works.

Jean Paul stands apart entirely by himself in German literature, a humorist of the first water, a Titan, 'a colossal spirit, a lofty and original thinker, a genuine poet [in prose], a high-minded, true, and most amiable man... He advances not with a man of understanding, with his mind, intellect, and pathos, and wit, and humour, and imagination, moving onward like a mighty host, motley, ponderous, irregular, irresistible. He is not airy, sparkling, and precise, but deep, bilious, and vast' (Carlyle). 'Two irreconcilable tendencies simultaneously present in him—lachrymose sentimentality, that shrank from the rough buffets of life, and sought refuge in emotional dissipation, luxuriating in tears, crying sorrow, consisting with love, melting in melancholy longings for the world beyond the grave; and a short, sharp, wide-awake sense that saw everyday realities with the utmost clearness and discrimination. All his great qualities of imagination and intellect were, however, made ministers to his humour, which had the widest range, moving from the petty follies of individual men and the absurdities of modern life up to the paradoxes that are rooted in the permanent ordinances of the universe. He turns his irony—a tender, reverent, playful irony—upon all the relations of human life, even upon the holiest beliefs of his own heart. And, in spite of the eccentricities of the enquirer, he felt so strongly in him, Jean Paul had the heart of a truly great and good man. Börne calls him the author par excellence of the lovely born, the poverty-striken, the neglected, and the despised; to this class belong some of his finest characters, as Waz, Fixlein, Siebenkäs, Vilt. As a master of pathos is put by De Quincey above Sterne. Few, if any, have written with such tender love and such delicate feeling of the idyllic joys of the country and the happiness of simple domestic life, particularly in the schoolhouse and parsonage. He had a wonderful vein of sympathy, and the closest nature of woman, but has not created more than one life-like woman (Lenette). Yet the male characters of his books, in so far as they are humorous, are generally living beings, or else, if secondary characters, well-drawn pencil sketches; in outline, Jean Paul is the classic author of friendships (Siebenkäs and Leibgeber, Walt and Vilt); he matched them with his own friendship for Herrmann and Oertel, and for Otto and the Jew Emmanuel Osmond. Nature was to him a living and divine presence: he loved her reverently, from the solemn and abject, through the sublime. His descriptions of nature embrace some of the loftiest hymns the spirit of man has chanted to the beauty and sublimity of created things—e.g., several passages in Hesperus and Wild Oats, the Dream of the Universe in Siebenkäs. God and the immortality of the soul were the great facts ever present to his mind, influencing all his thoughts. An enduring sense of the ethical worth of human action, 'a noble reverence for the spirit of all goodness forms the crown and glory of his culture' (Carlyle). The reason why he is so little known, except by name, is that the English (1812) is the most difficult to read, and it may be added to understand. No reader who has not the strongest constitution can struggle through the tangled thicket of encyclopedic learning, the tortuous wit, the dreyish wastes of digression and dullness, the holiness of tropical sentimentalism, amid which the gem-like gardens of his creative art are hidden. His prose is harder to translate than Heine's verse. For literary form, for order, harmony, or restraint he has not the slightest respect. The principal idea in his (often) long sentences is too frequently obscured amid a shower of qualifying clauses. The story is chiefly a peg for Jean Paul to hang Jean Paul's self-communings and reflections upon, a point d'appui for the play of his wit and humour. The wildest improbableities, the wildest extravagancies of fancy, are indulged in without restraint, but with a fine, learned, and learned, with allusions, analogies, images, metaphors, similes, tumbling one over another in inextricable confusion. A Creusis of idios, he is the greatest and most prolific word-coiner in the language: he compels words to adapt themselves to his ideas, as a dreamer indulges in a dream of his own. He is bombastic, and his literary taste execrable; yet when he is at his best his language marches with a majesty, a dignity, a natural beauty that are seldom matched in German literature. Carlyle's
RICHTHOVEN

Sartor Resartus and French Revolution are steeped in the spirit of Jean Paul, and show how greatly he fascinated the imagination of the rugged Scotsman.

The best editions of Jean Paul’s Werke are the editions of 1860–62 (34 vols., 1879 (90 parts), and 1882 et seq. (Kürschner’s Deutsche National-Literatur series). The best edition of his letters is that of Otto and Forster (1827–33); Spazier’s Biographischer Kommentar zu Jean Paul’s Werken (5 vols. 1833); Förster’s Denkwürdigkeiten (4 vols. 1865); Correspondence between Jean Paul and Otto von Goethe with Charlotte von Stein, 1826–33 (1826), and Voss (1833); and Fr. Vischer’s Kritische Gänge (new series, vol. vi. 1875). In English the best accounts are contained in Carlyle’s Miscellaneous Essays (vols. i. and iii.); De Quincey’s Anatomia of specimens passages translated (vol. xi. of Collected Works); and Life of Jean Paul F. Richter (1843). Lady Chatterton published a collection of translated extracts in 1830.

RICHTHOFEN, Ferdinand, Baron von, traveller and geographer, was born at Karlsruhe in Silesia, on Nov. 14, 1815, and educated at the universities of Berlin, and at the Geological Institute of Vienna (1856), and in 1890 accompanied a Prussian expedition to eastern Asia. The next twelve years he spent in travelling through Java, Siam, Burmah, China, Tibet, and France, and in 1868–72. After returning to Europe (1872) he was appointed president of the Berlin Geographical Society (1873–78), professor of Geography at Bonn (1875), and of Geography at Leipzig (1883) and at Berlin (1886). His reputation as a geographer is built principally upon his great work on China (Berlin, 4 vols. 1877–81), and upon Die Metalproduktion Kaltlandis (1862), The National System of Volcanic Rocks (San Francisco, 1867), Anfangen und Methoden der heutigen Geographie (1883), and numerous articles in geographical journals. Died in 1888.

RICINUS. See CASTER-OIL.

Ricketts (according to Skert, akin to A.S. riquen, ‘to wring’), or RICHTER (Dr. Glisson’s posthumous friend, died in 1650), is a term for the ‘spine,’ because a peculiar form of spinal curvature results therefrom, is a disease of children, chiefly characterised by the imperfect development, softness, and consequent distortion of some or many of the bones. The bones thus affected consist of a sort of soft bone, which will bend without breaking; and they are so soft that they may be cut with the knife. Though so soft, they are thickened, especially at the parts where growth normally takes place most rapidly; the enlargement of the wrists, ankles, &c., which results has led to the term ‘double-jointed,’ often applied to those suffering from the disease. The weight of the body and the action of the muscles acting on bones thus constructed cause them to bend, and the thighs or shins are abnormally arched, or the spine is curved, in slighter or greater degree; and only the normal form of the ankle is modified. In aggravated cases the chest is so affected as to give rise to the condition known as ‘pigeon-breasted;’ the lower jaw is imperfectly developed, and the teeth project; and the pelvis becomes so altered in form as to render walking difficult and walking in the highest degree perilous. Ricketts is exclusively a disease of childhood, and rarely begins later than the second year. It appears to be caused by unhealthy surroundings, particularly defective or improper food, and insufficient light and air. It is frequently more common among the poorer classes, and in towns. It is not due in most cases to the want of lime-salts in the food, but to the want of power in the child’s system to assimilate them. In some of the large cities of Europe one-third or even a larger proportion of the children brought to the out-patient departments of hospitals are more or less affected. It is a very chronic disease, and if at all severe leaves its mark on the bones for life. It is very rarely fatal of itself; but Gaertner and Baur believe it to be a cause in others to resist attacks of other diseases (brucellosis, diarrhoea, hooping-cough, measles, &c.). In Germany this malady is, under an old misapprehension, called the ‘English disease.’

The treatment must be mainly directed to the improvement of the general health. Free exposure to pure bracing air, sponging with sea-water, or sea-bathing if the little patient can bear it, an abundance of suitable and nourishing food, cod-liver oil, iron, and quinia include all that need be said about general treatment. The administration of lime-salts seems to do little good, though it might naturally be thought the one thing needful. While the bones are still soft great care must be taken to keep the child in such attitudes as will cause the least possible strain upon the bones that are not yet ossified and so fixed in faulty positions surgical interference may often be useful in producing amelioration of the condition.

RICKMAN, Thomas, an English architect, was born at Maidenhead in Berkshire in 1776. He was undecided as to a calling, being in succession chemist, grocer, corn-factor, and insurance agent. But he seems to have always had a love for architecture, and to have studied it carefully. Having sent in a design for a church that proved successful in a government competition, he settled at Birmingham as an architect. He designed a great number of affected children are much less able in Birmingham, Hampton Lucy, Bristol, Preston, Carlisle, &c., many country-houses, and the New Buildings of St John’s College, Cambridge. He died in March 1841. His Attempt to discriminate the Styles of Architecture in England from the Conquest to the Reformation (1817; 6th ed. by J. H. Parker, 1862) is still a standard authority.

RICKMANSWORTH, a town of Hertfordshire, at the confluence of the Colne, Gade, and Chess, 4 miles W. by S. of Watford. It has a church (rebuilt in 1890) with interesting monuments; and near it is Moor Park, the seat of the ill-fated Duke of Monmouth, who was beheaded (1821) 6211; (1881) 7672. See R. Bayne’s Historical Sketch (1870).

RICOCHET, in Artillery, is the bounding of a shot along the ground which takes place when a gun is fired low. Intentional ricochet firing was first introduced by Vauban at Philipburg in 1688, believing it to have great actual and moral effect in clearing the face of a ravelling, bastion, or other rather long line of fortification.

RICOH, Philipe, a French physician, was born on 10th December 1800, at Baltimore, U.S. He came to Paris in 1820, and after 1828 delivered there two annual courses of lectures at the Pitie on surgical operations, and was appointed surgeon-chief to the public hospitals for venereal diseases. This post he held till his retirement in October 1860. He died on 22d October 1889. Ricord won a world-wide reputation in the specialty which he had chosen, a reputation which he owed to his combination of surgical skill, physiological knowledge, manual dexterity as a surgeon, and felicitous inventiveness and resource as a physician.

The more important of his numerous works are On the Employment of the Speculum (1833); Treatise on Venereal Maladies (1838); On Blennorrhagic Ophthalmia (1843); Iconographie Clinic of the Venereal Hospital (1841–60); Letters on Syphilis (3d ed. 1863); and Lectures on Cancer (2d ed. 1860).
Riddles (A.S. réddels, from reddan, ‘to interpret’), or Sense-Riddles, to adopt Dr Tylor’s phrase, have been defined as ‘roundabout definitions of the heavier kind to guess at’. They resemble what M. B. Miller in his Dictionary as to-day they are popular among many half-civilised races—not absolute savages, for to perceive an anomaly demands some measure of culture. They may be broadly divided into two classes—riddles admitting of more or less easy solution and riddles whose solution at any wit of man, unless indeed, as is very often the case, the answer is known already. To the former class belong the enigma propounded by the Sphinx to Oedipus (q.v.), and that which, according to Plutarch, Homer died of chagrin at not being able to solve. The latter kind seems to us easy now, for it was the one about the two boys who went hunting: all they caught they flung away, and all they could catch they carried home. Of insoluble riddles Samson’s is a good instance, and this which, in a Russian folk-tale, is put by ‘Boots’ to the princess: ‘As I came to you I saw on the way what was bad, and I struck the bad with a bad thing, and of what was bad the bad died.’ Naturally the princess could not guess that he had killed a snake with his lance; she gave it up, and had to marry him. Such propounding of riddles by sages (here it should be a hearer in the sense of the instance) meets us frequently. Josephus relates how Solomon and Hiram, King of Tyre, once had a contest, in which Solomon first won a large sum of money from Hiram, but presently lost it all back to Hiram’s subject Abdonius. The Queen of Sheba, again, came to pose the wise king with enigmas (‘venit tentare eum amagialisus, so it runs in the Vulgate); the trials of skill between Virgil’s shepherds are a standard classical instance; and, to come down to later times, the Russian folk-tale has many analogues in other folklore halls of our own ballad minstrelsy—e.g. in ‘Proud Lady Margaret’, ‘Captain Weilderbough’, and ‘The Elin Knight.’

The riddle is found in the Koran, and several collections of riddles exist in Arabic and Persian. They were, it seems, also known to the ancient Egyptians. Among the Greeks they were allied in the earliest times with the oracular responses, and, like Samson’s riddle, were generally in poetical form. But in Greece they first came into vogue about the time of the Seven Sages, one of whom, Cleobulus, was celebrated for the feat of reciting the Iliad on his memory. Many greater poets did not disdain to introduce them into their writings, or to devote whole poems to the subject—e.g. the Syrinx, commonly ascribed to Theocritus. Appuleius wrote a Liber Ludiorum et Graiporum, but it is lost; and almost the only name we can fix upon is that of Celsus Firmianus Synopus, whose riddles, comprising a hundred hexameter triplets, are termed by St Aldehelm ‘rubbish’ (‘carmina inepta’).

The riddle, but more perhaps as an amusement for the barnyard bull on winter nights, or for the monkey testatory, than as a serious intellectual effort, was much cultivated during the middle ages. Many French, English, and German riddle-books exist in MS., and some were printed at an early period. Wynkyn de Worde’s Demunadys Joyous (1511) contains several riddles that are simply crude rhymes, and as such even the simple faith of medieval Christendom—e.g. ‘Demand: What bare the best gardener that ever was borne? Response: The ass that carried our Lady when she fled with our Lord into Egypt.’

The Reformation checked, if it did not wholly stop, the merry pastime of riddle-making; but in France, in the 17th century, it began to creep back into favour, until at last riddles riddled in popu-

Riding

Riding (Scand. thridding or tridding, ‘third part’), a term applied to the three parts into which the county of York is divided, termed respectively East, West, and North Riding. A similar division existed in several other countries as the Saxon period, as the laths of Kent, the rapes of Sussex, the parts of Lincoln. In Domesday Book Yorkshire was divided, as at present, into three ridings, and subdivided into wapentakes.

Riding and Driving

The art of riding may be divided into (1) ordinary riding, (2) school riding (as at Windsor, Eton, Harrow, and Cowley), and (3) riding for sport or hunting. The two objects aimed at in ordinary riding (which includes riding on the road, hunting, pig-sticking, stock-driving, breaking in young and freshly handled horses, playing polo, race and steeplechase riding) are to retain in the saddle and to make the animal carry its rider with the greatest possible ease to itself. The former of these objects is the one almost entirely aimed at by the breaker when giving his first lessons; the latter, by the flat-race jockey. Hence we find that the saddle and seat adopted by the Colonial backjumping rider are those that are best suited for ‘stocking on.’ The large pads on the flaps of his saddle are about six inches deep, and are curved backward, so as to fit against his thighs, a little above the knees, in a manner similar to that in which the third crutch (or leaping head) acts on the lady’s back. These extraordinary and illusory effects, instead of being in which most security can be obtained, is the one by which the rider can best conform to the movements of his mount. Hence we find that, even in Australia, many of the best jockeys on the flat are but very poor performers on a backjumper. In all kinds of riding balance rather than grip should be the chief means for retaining one’s seat in the saddle, for if muscular
action be constantly employed to 'stick on' the muscles then brought into play will soon become tired, and will be unable to act at the very moment their aid is most required. One valuable rule in riding is, until the leg to the animal's side, the leg from the knee down should remain firm, so that neither knee nor foot will work backwards or forwards. The movements of the upper part of the body should be regulated by the play of the hips. There should be no hollowing out of the small of the back or pushing out of the chest, or any other action which is put on the outside, so that the great reason why any approach to stiffness, when riding, should be avoided is that it has to be maintained by muscular effort and is consequently followed by fatigue. As soon as the muscles become tired they are weak and low and can consequently, if they be kept stiff (or, more correctly speaking, in a contracted condition) they will be unable to do any work they may be called upon to perform in an effective manner as they would do were they kept loose. Hence a person should ride in correct form and position, and the moment comes to put forth the required muscular effort. The rider should endeavour to avoid the two very common faults of holding on by the reins and of putting too much weight on the stirrups, and he should try to ride with his seat well back, and not 'stick on.' If he finds that he is insecure in his saddle he should allow no false shame to prevent him from getting one in which he will have a firmer hold. To give this additional grip the saddle may be covered with buckskin, or with leather, or with leather side of back and saddle. The English style of riding, which has been adopted with marked success in the hunting-field, racecourse, steeplechase-course, and polo-ground, is treated clearly and systematically in Captain Hayes's Riding (Thacker & Co., 3d ed.), a work which is the best known advice given in that excellent work, Colonel Greenwood's Hints on Horsemanship (Moxon & Co., London). In the Badminton Library book on Riding (Longmans, Green, & Co.) this subject is treated from the old-fashioned riding-school point of view, at which we shall presently return.

In school riding the object of getting the horse to carry his rider with the greatest possible ease to himself, which is the chief aim of the ordinary rider, is sacrificed to a large extent for increased control, so as to get the horse to perform the various actes de manège with precision. The English military riding system is a kind of compromise between that of the continental haute école and the English hunting style. Although grand improvements have been made in high school riding in France and Germany, instruction contained in The Cavalry Regulations has remained practically unaltered for the past thirty years. M. Baucher, we may remark, was the great master of school equitation of the previous generation. His system has been much modified for the better by Colonel Greenwood. M. Filius, though these masters differ in some details from each other, M. Barroil's Art Équestre (Rotterdam, Paris) is moulded on the teaching of Bauche. Principes de Dressage et d'Equitation (Marpon and Flammarion, Paris), by M. Filius, is a work of much use in matters of Equitation ottantaine, and should be carefully studied by the student. Previous to their appearance Mr E. L. Anderson wrote Modern Horsemanship on the same subject; but it is neither so elaborate nor so instructive as either of the other two, which ought to be read conjointly. Of the two we prefer that of M. Filius, especially as he teaches that the horse should carry his head in a freer and less fatiguing manner than M. Baucher. In the respect follows the instruction of Baucher. In M. Filius's book there are some valuable commentaires sur Baucher.

Although exhibitions of school riding are often given in a circus, we must separate it from circus riding, which consists of acrobatic performances (standing, leaping, dancing, and tumbling) in an upright position, either on a pad or on the bare back of a horse. The only part which we could term riding, in the usual sense of the term, is the 'bounding jockey act,' in which the 'artist,' while riding round the ring, takes off his saddle, stands on it, gets off his horse, and jumps astride on him and on top of his back while the animal is galloping round.

In saddle riding the lady depends for security of seat on the stirrup, and if she has on the upper and lower crutches. Her right leg is placed over the former, and she presses her left leg, a little above the knee, against the latter when she seeks her aid. Her left foot should not be placed 'home' in the stirrup, but only as far as the ball of the foot ; that is to say, [1524] If, when her left leg is held in this manner, she can just feel the pressure of the lower crutch, the length of her stirrup will be about right. The only pace at which she should put weight on the stirrup is the trot. The great requisition for obtaining a 'square' seat is that the rider should take the right advice given in that excellent work, Colonel Greenwood's Hints on Horsemanship (Moxon & Co., London). In the Badminton Library book on Riding (Longmans, Green, & Co.) this subject is treated from the old-fashioned riding-school point of view, at which we shall presently return.

The art of driving is studied in Great Britain chiefly with a view of having the horses in perfect control, which is necessitated by the hilly nature of the country and by the crowded condition of the thoroughfares in the cities and towns. In America and Australia there are better opportunities for fast driving. Hence in England a showy style of trotting is sought for, while the speed is more thought of in the United States and in the Antipodes. Although strenuous efforts are being made to establish trotting as a sport in Britain, and trotting meetings are often held at the Alexandra Park, Liverpool, and elsewhere, we greatly doubt whether it will obtain any permanent footing.

The best books on driving are Driving (Badminton Library); Riding and Driving, by J. H. Walsh; Coaching, by Lord W. P. Lennox; Down the Road, by C. T. Reinhart-Reynolds; and The Art of Driving, by M. Filius. Miss Ridley publishes horse-racing and trotting books.
both universities; Tyndale and Blilney had taught the new doctrines at Cambridge, and Ridley, no less than Cranmer and Latimer, Cambridge students about the same period, had early caught something of their spirit. Ridley went next to Leiden, as it was, and, like Tyndale, met with some of the most active Reformers abroad, after a three years' absence returned firmly grounded in the new doctrines. He was made proctor to the university of Cambridge in 1533, became domestic chaplain to Cranmer, afterwards to the king, and had already been made vicar of Herring-cam, near Westminster, then of Canterbury, and rector of Soham, when in 1547 he was raised to be Bishop of Rochester. An ardent and outspoken Reformer, yet without either bigotry or intolerance, he brought great learning and admirable preaching power to the cause, and quickly made himself one of the foremost leaders of the church. On the deprivation of Bonner, Bishop of London, in 1550, Ridley became his successor. In this high position he distinguished himself by his moderation, his learning, and his munificence, prompted Edward VI. to found St Bartholomew's Hospital and St Thomas' hospitals, and assisted Cranmer in the preparation of the Forty-one Articles, afterwards reduced to thirty-nine. In 1552 he visited the Princess Mary at Hunsdon, but failed to shake her adherence to her mother's faith. Thereupon, after the accession of Mary I., he was imprisoned for the cause of Lady Jane Grey, and at St Paul's Cross declared both Mary and Elizabeth to be illegitimate, July 16, 1553. As soon, however, as Mary was proclaimed he repaired to Framlingham to maintain his house, but he was coldly received, and soon stripped of his dignities and sent to the Tower. Once at least he attended mass, but his spirit soon returned to him. In March 1554 he was sent to Oxford, together with Latimer and Cranmer, to be tried by a committee of convocation, and after a fall the nobled and tawdry collar round his neck, he was adjudged defeated and obstinate heretics, and condemned to suffer at the stake. As England was not yet formally reconciled to Rome, the sentence could not be carried out, and accordingly Ridley lay in Bocardo gaol at Oxford for eighteen months, writing the whitsun and the tithing a foreword letter to his friends. After the formality of a second trial he was led forth to execution, along with Latimer, 16th October 1555. The stake was placed in front of Balliol College, and there Ridley played the man in the midst of awful torments of a smouldering fire that burned him slowly to death. His writings were collected in a volume of the Parker Society series (1841), with a life by Rev. H. Christmas. See his Life by Dr Gloneester Ridley (1763).

Richm, Eduard (Karl August), a learned Protestant theologian, born at Diersburg in Baden, December 29, 1830. He studied at Heidelberg and Halle, became Very at Durham in 1858, garrison preacher at Mannheim in 1854, and was qualified as privat-docent in the theological faculty at Heidelberg in 1858. He was appointed an ordinary professor here in 1861, at Halle in 1862, and ordinary professor at the latter in 1866. He died April 5, 1888. Of his numerous books most important are: Der Lehrbegriff des Hebrerbriefs (1858-59); 2d ed. 1867; Die Messianischen Weissagungen (1875); 2d ed. 1886; Eng. trans. 1890); Der Begriff der Sühne im Alten Testament (1877); and the posthumous Alttestamentliche-Theologie (ed. by A. Brandt, 1880) and All Testament (ed. by A. Brandt, 2 vols. 1889-90). He edited the second edition of Hupfeld's Commentary on the Paulinas (4 vols. 1867-71) and the invaluable Handwörterbuch des biblischen Altenthums (1884), and was from 1863 joint-editor of the quarterly Theologische Studien und Kritiken.

Riel, Louis, a Canadian insurgent, born in Manitoba in 1844, became a leader of the Metis, or French half-breeds, and headed the Red River rebellion in 1869-70, afterwards escaping from the country. By abducting him he again established a rival government in Manitoba, and in September, when the rising having been quelled, he was executed at Regina.

Rienzi, Colla di, the famous Roman tribune, was born at Rome in 1313. His parentage was humble; his father being a tavern-keeper named Lorenzo. But when the family name of Gabrini is sometimes added. The son, Nicolas (shortened into Cola) studied grammar and rhetoric, read and re-read the Latin historians, philosophers, and poets (Greek was scarcely yet known in Italy), and excited his imagination, while at the same time he coloured his speech, with the prophetic enthusiasm of the inspired writers. The assassination of his brother by a Roman noble, whom he found it impossible to bring to punishment, finally determined him to deliver the city from the barbarous thraldom of the barons. Having found the Guelph party spokesman of a deputation sent to the papal court at Avignon by the commencement of Clement VI., to return to Rome in order to protect the citizens from the tyranny of their noble oppressors. Here he obtained a favourable hearing from the pope, who appointed him to the civic chamber. In April 1344 Rienzi returned home, and sought to obtain the countenance of the magistrates in his ideas of reform, but reform found it impossible without revolution; and for three years he loudly and openly menaced the nobles. At last, when they could rely on the support of the citizens, he summoned them together on the 28th of May 1347, and, surrounded by 100 horsemen and the papal legate, he delivered a magnificent discourse, and proposed a series of laws for the better government of the community, which were unanimously approved. The aristocratic senators were driven out of the city, and Rienzi, as tribune of the holy Roman republic, was invested with practically dictatorial power. The pope confirmed the eloquent dictator in his authority; all Italy rejoiced in his success, and foreseen him as the future of Italy, even while respecting to his enthusiastic friend and admirer, Petrarch), began to dread the reviving majesty of the Eternal City. A bright dream flashed across Rienzi's imagination, the dream of every great Italian from Dante to Mazzini,—the unity of Italy and the supremacy of Rome! Rienzi despatched messengers to the various Italian states, requesting them to send deputies to Rome to consult for the general interests of the peninsula, and to devise measures for its unification. These messengers were everywhere received with enthusiasm, and on the 1st of August 1347, 200 deputies assembled in the Lateran Church. Rienzi was crowned tribune with great ceremony on the 15th April. But the nobles were still bitterly hostile; Rienzi, who defeated them in a bloody battle on the 20th November, became suddenly infected with the insouciance of victory and power, and proceeded to levy taxes and enforce obedience. The papal authority was turned against him; after a short reign of seven months he lost heart at the combination of forces against him, and fled to Naples.

After two years of religious meditation among the mountains of the Abruzzi, Rienzi resumed his life as political reformer, and went to Prague to secure the support of the emperor, Charles IV. Charles, however, sent him as a prisoner to Pope Clement VI. to Avignon, but by the mediation of Petrarch he was released from imprisonment. A new pope,
RIFLES

RIFLE-BIRD (Ptilorhis paradisaea) often spoken of as one of the 'Birds of Paradise,' is perhaps the best-known species of a genus which, according to Elliot, comprises four species confined to Australia and to New Guinea. Ptilorhis paradisaea inhabits the south-eastern districts of Australia, and is found only in very thick 'bush.' The male is regarded as more splendid in plumage than any other Australian bird. The upper parts are velvety black, tinged with purple; the under parts velvety black, diversified with olive-green. The crown of the head and the throat are covered with innumerable little specks of emerald green of most brilliant lustre. The tail is black, the two central feathers rich metallic green. The female, as is often the case, is much duller coloured than her mate. See HONEY-EATER.

RIFLES. A weapon, whether cannon or small-arm, whose bore is grooved with spiral channels for the purpose of causing the projectile, when fired, to rotate round its axis, and thus to impart steadiness to it in its passage or flight through the air. The subject of rifled cannon has already been dealt with under the head of Cannon (q.v.); in this article, therefore, it is intended to deal only with the question of rifles as applied to small-arms, whether military or sporting. The idea of imparting steadiness to the projectile and thereby increasing the accuracy of fire is one which has exercised the minds of scientific-artillers and gunsmiths from a very early period in the history of firearms. The cause of inaccuracy when firing a spherical ball from a smooth-bore firearm may be briefly explained as follows: in all muzzle-loading arms the projectile must be smaller in diameter than the bore of the gun, otherwise it could not enter and be rammed home from the muzzle; the projectile therefore rests on the bottom of the barrel, and its centre is below the axis of the bore. When the gun is fired part of the gas generated by the explosion of the powder escapes over the top of the ball, causing a downward pressure on it; as this pressure is removed during its passage down the barrel the ball impinges on the top side of the barrel, and so on, up and down and from side to side, until it leaves the muzzle of the gun; the direction of its flight is therefore not in line with the axis of the bore; the ball is, in fact, set in rapid and violent movement against the side of the barrel. To overcome this inaccuracy the idea suggested itself to cut grooves in the bore of the barrel which by gripping the ball would cause it to rotate round its axis and to leave the barrel more nearly in line with the axis of the bore.

The first authenticated instance we have of a rifled small-arm being actually used was in the year 1563, when the Swiss government issued an edict to the following effect: 'For the last few
years the art of cutting grooves in the chamber of the guns has been introduced with the object of increasing the accuracy of fire; the disadvantage resulting therefrom to the common marksmen has been soon discarded amongst them. In ordinary shooting matches marksmen are therefore forbidden under a penalty to provide with smooth-bore arms. Every one is nevertheless permitted to ride his military weapon and to compete with marksmen armed with similar weapons for special prizes.

In the latter half of the 16th century Augustus Kutter of Nuremberg brought out a rifle the grooves of which were cut with the idea of thin form of rifling. In 1602 a cleric, the Bishop of Munster, invented elongated projectiles for use in such arms, but whether in conjunction with a rifled arm or simply with the idea of improving the accuracy of a smooth bore is not known. In 1729 Lautmann, a Russian, brought out a pamphlet advocating the advantage of firing with balls of an elliptical form with a cavity at the base so as to augment considerably the impetus imparted to the projectile when fired from a rifled arm. Lautmann undoubtedly hit upon the true theory, and had his idea put to practice by the Russian government in the 1730s. The armies of Europe in would in all probability have been armed with rifles a hundred years sooner than they actually were. But Lautmann, like so many other inventors, was in advance of his age and did not live to see the correctness of his theory vindicated.

In 1750 Wild brought out a rifle with six grooves having one turn in the length of the barrel, from which he fired balls weighing eighteen to the pound, wrapped in an envelope of greased linen, the object of the linen being to fill up the bore and to prevent the entry of any powder into the barrel; but nothing came of his invention. And again in 1770 experiments, which were not successful, were made at Metz with elongated bullets.

The adoption of rifles into the British service dates from about the year 1800, when the old 93th Regiment, which later became the Rifle Brigade, were named with 'Baker's rifles,' so called from the name of the inventor. There were two patterns of this arm, one with eleven and the other with seven grooves, the twist of rifling being one turn in 130 inches. The weight of the rifle was 8 lb. 9 oz. and the barrel 99 inches long. The barrel was 2 feet 6 inches, and bore 705". The barrel was spherical; before being rammed home it was wrapped in a greased patch, there being a cavity in the butt for carrying these patches. After firing a few rounds the barrel became so foul that it was difficult to ram the bullets home; a wooden mallet was therefore served out with each rifle to drive the ball down the barrel. This rifle remained in the British service till about the year 1835, when it was superseded by the Brunswick rifle, the invention of Major Berthier in the Brunswick army, which with new two grooves having one turn in the length of the barrel; the bullet, which was spherical, was 'belted'—the belt fitting into the grooves in the barrel—this method being adopted to give the bullet a spin. A grease patch was also used with this rifle; it added greatly to the difficulty of loading, as it made it extremely difficult to see whether the bolt on the barrel was properly placed in the grooves or not. This rifle was the first arm in the British service which had a percussion-lock, and it was not till the year 1842 that a percussion-musket was adopted for service. A rifle with a similar design was about the same time adopted in Russia and in some of the German principalities.

In 1837 a rifled arm was adopted in France for the use of the 'Chasseurs' or rifle regiments. This arm was rifled in the chamber on a system invented by Captain Delvigine of the French army. The diameter of the chamber was slightly smaller than the calibre of the bore; the ball was driven into the rifling, but not sufficiently far to crush the powder. In 1841 the Prussians discarded their old muzzle-loading smooth-bore musket, and introduced in its place another kind of rifle, the having of the rifled barrel, was also made to load at the breech, and in a few years the whole Prussian army was armed with the celebrated 'Zündnadelgewehr' or needle-gun. This arm, the invention of Dreyse (q.v.), is a bolt-gun, the needle being contained in the bolt. It was in form indistinguishable from the having of the bolt to release it from its fastening, then draw back the bolt and insert the cartridge, close the bolt and lock it by turning the handle down to the right. The act of closing the bolt compresses the mainspring and holds back the needle, which is released in the usual way on pulling the trigger. The cartridge is a peculiar one. There is a paper-naché plég called 'Zündspiegel,' in which is imbedded the bullet in the form of an egg. The percussion-cap is fixed in the rear of the plug; behind the plug is the powder charge. The powder, the plug, and the plug hole is crammed in a cartridge-case, which is tied in front of the bullet. On firing the gun the needle presses through the powder charge and strikes the cap in the plug so that the charge is ignited from the front, the idea being that by this means the bullet is less likely to be detached from its bed in the paper-naché pig, which latter takes the rifling and imports rotation to the projectile, the diameter of which is .54 of an inch, whereas the calibre of the barrel is .61 of an inch.

During some experiments at Spandau in 1846 so many needles were broken that the continuation of the arm in the service was in great jeopardy; but its efficacy in quelling disturbances in the troublous times in 1848 and 1849 was so great that in the year 1850 a further large number of arms was made, and the system was further extended by the introduction of carbines on the same model. In 1842 the Austrians armed their rifle regiments with a rifle. Thus we see that by the year 1842 all the great powers of Europe had armed a part of their troops with rifles, and that by 1846 the whole of the Prussian army was not only so armed, but the length of the barrel was increased; thus the superiority over all others of being breech-loaders.

Another point in which the Prussians had a superiority over other nations was that they had a complete cartridge combining in one case the projectile, the powder charge, and the percussion-cap—the introduction of a breech-loader enabling them to have a capped cartridge instead of having to place a cap on the nipple for each discharge. Those who are old enough to remember the old percussion-lock with the capping and uncappping of the nipple will appreciate the immense advantage that was gained by the introduction of the breech-loader.

The vast superiority of the Prussian needle-gun over the rifles in use in other countries gave a great impetus to the spirit of invention, and in 1849 Captain Minié (q.v.), of the French army, brought out a rifle called the Minié rifle; this arm was first introduced into the French, and subsequently, about 1851, into the English army. Up to this date rifles were only issued to rifle regiments, but with the introduction of the Minié rifle it was intended to discard the smooth-bore altogether and to arm the whole army with rifles. The adoption of the breech-loader on a larger scale was the advance; it was the first time the spherical bullet was discarded in favour of one of a conical-conoidal form. The bullet had a hollow base in which was placed an iron cup; on the explosion of the powder this cup forced the bullet into the grooves.
of the rifling. The separate grease patch was discontinued, lubrication being obtained by greasing the paper in which the bullet was wrapped with a mixture of tallow and beeswax. The rifle weighed 9 lb. 13 oz.; its length was 4 feet 7 inches. The breech weight was 1 lb. 15 oz. and was 1½ inches long; the diameter of the bore was .702", the number of grooves three, having a twist of one turn in 38 inches. The charge of powder was 2½ drams, or nearly 70 grains, and the weight of the bullet was 680 grains. The rifle was sighted to 1000 yards. A description has been given in some detail for the sake of comparison with the rifles of the present day. All the English infantry regiments which proceeded to the Crimea armed in the first instance with this rifle, and a large proportion of the French army also had a rifle constructed on the same principle, ranging in detail from the English pattern. This gave the allies an immense advantage over their Russian adversaries, who were still, with few exceptions, armed with the old smooth-bore.

The Snider rifle was cumbersome and heavy, and as early as 1852 experiments were made with a view of obtaining a better weapon. The result of these experiments led to the introduction of the Enfield Rifle, Pattern 1853, so called from the Royal Small-arms Factory at Enfield, Leek, of which factory the rifle was first introduced. The principal point of difference between this arm and the Minie was the great reduction in the diameter of the bore from .702" to .577". This reduction of the bore enabled the barrel to be made very much lighter without in any way impairing the arm as a shooting weapon, in fact it shot very much better, as the bullet was better proportioned. And, while the powder charge remained the same, the bullet was reduced in weight from 680 to 556 grains; by this means the initial velocity was greatly increased and the height of trajectory diminished at all ranges. The lubrication of the barrel was the same as in the Minie. There were two descriptions of this rifle, the long and the short; the long was issued to the regiments of the line, and the short to rifle and light infantry. A carbine was also constructed on the same principle for issue to the cavalry and Royal Artillery. The issue of this rifle and ammunition to the native troops in India was the occasion of the Indian Mutiny of 1857, it being believed that the grease round the bullets was occasionally spread on the food by accident to deleterious Hindoos and Mohammedans alike.

But while the armies of Europe, with the exception of the Prussians, were all armed with a muzzle-loading rifle more or less on the principle of the Minie, experiments were being continually carried on with the view of obtaining a good breech-loader. It was not, however, till the Danish war of 1864 that the very vast superiority of the breech over the muzzle-loader was brought prominently home to the authorities. The need was urgent, but in order to give time to discover a really satisfactory breech-loading rifle it was determined in the instance to convert the Enfield into a breech-loader by attaching the Snider breech-action to the Enfield barrel. The old arms were readily converted, and a large number of new arms were made cheaply, so that by the winter of 1865 the Franco-Prussian war the whole English army was armed with the Snider breech-loader, and during the winter of 1871-72 the militia and volunteers also received these arms; but it was perfectly well understood that the introduction of the Snider breech-loader was only intended to fill the gap until a more perfect and more efficient weapon could be devised; and after an almost exhaustive series of trials, which had been conducted for some time by a special committee appointed for the purpose, the Martini-Henry rifle was in the year 1871 recommended for adoption in the English army.

The manufacture commenced shortly afterwards, and the first issue of rifles of this pattern to the troops was made in 1872. The Martini breech-action has already been described under the head of Breech-loading (q.v.). The barrel was the invention of Mr Alexander Henry, a gunmaker of Edinburgh. The calibre is .45", and the form of the rifling is peculiar. Fig. 1 represents an end section of a barrel rifled on this system. There are seven grooves, having a complete turn in 22 inches, cut in the barrel, forming seven plain surfaces at AA. These are tangential to the periphery of the projectile which is represented by the dotted circle C. In addition to the bearing surfaces thus obtained there are seven angular projections, BB, extending inwards from the ends of the grooves on plain A. Thus in its passage down the bore the bullet has fourteen bearing surfaces at AA...BB, and it expands into the spaces left between A and B, and thus obtains its rotatory motion. Whilst these transformations were going on in England the French had adopted the Chassepot rifle in 1866, superseded in 1874 by the Gras; the Germans in 1871 discarded the needle-gun and adopted the Mauser (see BREECH-LOADING); the Austrians after their war with Prussia in 1866 adopted in 1868 the Wurrdr rifle; the Italians adopted the Vetterli in 1871; the Russians adopted the Berdan rifled muskets in 1871; the British in 1871 by Mark II. of the same rifle; the Americans adopted the Springfield, whilst the minor states adopted breech-loaders of various designs and patterns. It is unnecessary in this article to give a full description of all these rifles, most of them having the bolt breech-action, a drawing of which may be seen under the head of Breech-loading (q.v.), and the tables at the end of the article give all essential particulars in connection with the more important arms.

At the time of its introduction the Martini-Henry rifle was probably the finest military rifle in Europe; it is extremely accurate either at long or short ranges; its bullet has great penetrative power. The rifle is simple and does not easily get out of order. But, while the Martini-Henry rifle was more accurate at all ranges and had a higher terminal velocity and lower trajectories at long ranges than the rifles of the continental armies, these rifles had a higher muzzle velocity and lower trajectory up to ranges of 300 yards. This was due to two causes: either the proportion of powder to bullet was greater in the foreign than in the English cartridge; and secondly, because the value of $\frac{DP}{W}$ was also greater—this being the
mathematical expression used in England to denote the power of the air to retard bullets in their flight, where \( D \) is the diameter of the bullet in inches and \( W \) its weight in pounds; therefore the smaller the value of the fraction the less power has the air to retard the flight of the bullet, and \( \text{vice versa} \). The larger the area in proportion to its diameter, the better able it will be to maintain its velocity at long ranges. It was determined to endeavour to remedy the defect referred to above, so that the English rifle should be superior to all others in all particulars at all ranges. To do this it was necessary to maintain the low value of \( D^2 \) and to increase the proportion of powder to bullet; this led to the introduction of the Enfield-Martini rifle, in which the Martini action was maintained, but the calibre of the barrel was reduced to 40". Owing to the high muzzle velocity obtained—viz. 1570 feet—the trajectory was very flat and the shooting exceedingly accurate. Several thousands of these arms were made, but before they were issued to the troops a far more important change was determined on—viz. the introduction of a magazine rifle. A magazine rifle makes one or more cartridges attached to a magazine or case or hopper containing four or more cartridges which are fed one by one into the barrel by mechanism in connection with and actuated by the breech-action; and the primary object of a magazine arm is to enable the soldier at a critical moment to fire a certain number of consecutive shots without having to reload from the pouch.

The great importance of a magazine arm was first practically demonstrated in the American war between the North and South in 1861, when one regiment of the northern army, armed with a magazine rifle, successfully resisted the attack of a force at least three times as numerous armed with the ordinary single loader, simply on account of the great rapidity of fire. And again in the war between Turkey and Russia in 1877 the constant repulse of the Russian assaults on the Turkish lines before Plevna was in a great measure, if not mainly, due to the fact that the Turks were armed with the Winchester repeating rifle, which enabled them to mow down the Russians by hundreds as they crossed the open to the assault. In the United States System of repeating arms several systems already in practical use, and after the experience of the Turkish war the question was seriously taken up by most of the European governments. By the end of the year 1879 the French government had adopted the Kropatschek magazine rifle for the navy; the Germans were experimenting with a Mauser rifle converted to take the Lee magazine; the Austrians were experimenting with the Kropatschek and the Spitalski; in Italy the Bertoldo rifle had been issued to some few regiments for trial; in Switzerland the army had adopted the Vetterli repeater; and in Norway and Sweden a repeater on the German principle was on trial. The matter was then taken up by the English government, and a committee was appointed by the War Office to consider the whole question. Although the number of arms is in itself a magazine itself, there being a few principal systems or types, which may for convenience be divided under the following heads: (1) Those with the magazine in the fore end of the stock under the barrel; (2) those with the magazine at the breech-action; (3) those with the magazine above and at the side of the breech-action; (4) those with the magazine in the butt of the stock; (5) those with the magazine in a circular form round the breech-action.

**Type No. 1** may be described briefly as follows: The magazine consists of a metal tube fixed in the fore end of the stock, and capable of containing eight or more cartridges. The tube or magazine is loaded by drawing back the bolt of the breech-action and inserting the cartridges one by one into the tube, until the breech end, and the bolt is then pressed against the bullet of the one next behind it. The action of unlocking and drawing back the bolt withdraws one cartridge at a time from the magazine, and places it in front of the bolt; and the action of closing the bolt forces the cartridge into the barrel. As each cartridge is thus withdrawn for loading, the column of cartridges within the tube is pressed back as already described, leaving another cartridge in position to be withdrawn for loading. There is generally a stop or ‘cut-off’ which, when applied, prevents the bolt from acting on the magazine so that the arm may be used as a single loader on occasions when it may not be considered either necessary or desirable to bring the magazine into play.

In Type No. 2 the magazine can either be detachable and carried in the soldier’s pouch, or be attached to the rifle when required for use, or it can be a fixture on the arm itself. In either case the magazine consists of a metal box containing from six to ten cartridges, according to the size of the cartridge. The cartridges, which are inserted at the top of the box or on the arm, compress a spring in the magazine which is generally either in form of a cylinder or in the form of a C. In this type of magazine the cartridges lie on the top of one another, and not bullet to base as described in No. 1 type. They are held in the magazine by a catch or ‘cut-off’, and when this is applied the rifle can be used as a single loader. On withdrawing the cut-off and drawing back the bolt, the spring in the magazine forces one cartridge up in front of the bolt, which, on being pushed home, forces the cartridge into the barrel. By a mechanical contrivance, only one cartridge at a time can be forced up out of the magazine.

In Type No. 3 the magazine can also be either detachable or a fixture on the rifle. In magazines of this type no spring is necessary to force the cartridge out of the magazine, which is loaded by dropping the cartridge in at the top. At the bottom of the magazine, on the side next the body of the rifle, there is a slot, with a corresponding slot in the body or shoe of the breech-action. On drawing back the bolt one cartridge passes out of the magazine through these slots into the shoe, and just in front of the bolt, by the action of gravity alone. The cartridge is then forced into the barrel by the action of closing the bolt. There is also a cut-off with magazines of this type to prevent cartridges passing through the slots when it is not required to use the magazine.

In No. 4 type various attempts have been made from time to time to utilise the butt of the stock by hollowing it out and converting it into a magazine. In this system the cartridges are brought up one by one into the loading position by a ratchet actuated by the bolt. As the bolt is drawn back the ratchet performs forced back, and remaining on to a cartridge brings it forward as the bolt is pushed home again. In Type No. 5 the cartridges are contained in a cylinder placed around the breech-action of the rifle. A spring acts on these cartridges and brings
RIFLES

them up one by one in front of the bolt, the act of closing forcing the cartridge into the barrel. There are objections to the two types Nos. 4 and 5 which have prevented the adoption by any government of a magazine arm constructed on these systems; it is unnecessary therefore to describe them further. Of the arms previously referred to as being under trial by various European governments at the close of the year 1879 the Kropatschek is an example of type No. 1, the Lee magazine of type No. 2, the Jarmann of type No. 3. There is no example of type No. 4, but the Spitzalk is an example of type No. 5.

The Germans were the first to re-arm the whole of their infantry with a magazine rifle; but, pending the result of trials which were being carried on with small-bore rifles and smokeless powder, they determined to disc the first instance to convert the then existing Mauser rifle into a magazine arm, as this would require no change of ammunition, the magazine being placed in the fore end of the stock as described under the head of No. 1 type. But it was generally understood that in order to derive the full benefit from a magazine arm the soldier would have to carry more ammunition, and, as it was not desirable to add to the weight of his equipment, this could only be done by reducing the weight of the cartridge.

A reduction of bore, therefore, became almost a sine qua non, as by that means only could a sensible reduction be made in the weight of the bullet and with it of the cartridge. But this led to fresh difficulties. It is quite impossible in the space available for this article to discuss fully all the difficulties which had to be overcome either as regards cartridge-case, bullet, powder, rifling, &c.; but it may be stated that it was generally conceded that the ordinary charge of loose black powder could not be used in a rifle with a bore less than an inch on account of the difficulty of overcoming the fouling which would take place in a small bore, and also on account of the difficulty of making a suitable cartridge-case. Therefore the question of the explosive to be used had to be considered in connection with the question of the reduction of the bore. The Swiss were the first to arrive at a practical solution of the difficulty. Two rifles were brought out in Switzerland very similar to one another, and merely differing in points of minor details. One was the Rubin rifle, having a caliber of 295 inches. The powder charge consisted of 76 grains of black powder compressed into a solid pellet, and the weight of the bullet, which was nickel coated, was 217 grains. The force of the powder was very greatly increased by compression, and, the proportion of powder to pellet being very high, a muzzle velocity was obtained of no less than about 1850 feet; and the value of being 2.8 the velocity

Experiments were carried on in England with both these rifles, and the results were such as to warrant the committee, which had been investigating the subject, to recommend in the year 1877 the adoption of a magazine rifle for the English army, of which the following is a brief description. The barrel is rigid in the Metford principle (fig. 2, C), in which there are no corners nor angles to hold the fouling. The twist of the rifling is one turn in 10 inches, the bore of the barrel is 0.332 inch, and its length 50-20 inches.

The bolt breech-action which has been adopted for the rifle is a modified form of the Lee bolt. The Lee magazine (fig. 2, D, E), as first adopted (Mark I.), holds eight cartridges, and is detachable—the i.e. it can be carried on the arm itself or in the soldier's pouch; its position on the arm is immediately in front of the trigger-guard underneath the body of the breech-action, in which a slot or opening is cut through which the cartridges are fed up by a spring ready to be pushed into the barrel by the closing of the bolt. There are two turned-in lips (fig. 2, D) at the mouth of the magazine under which the heads of the cartridges are inserted when filling it; the rim of the cartridge projecting sufficiently to be caught by the bolt. These lips prevent the cartridges from being shot out by the

spring, and hold the head down till the bullet has entered the chamber of the barrel. A cut-off is provided to enable the arm to be used as a single loader; this is a plate pivoted at one end, and it is pulled out by means of a thumb-piece projecting on the right side. When it is thus pulled out the magazine is in action, but when pushed in the plate partly covers up the aperture through which the cartridges pass out of the magazine, and forms a bed on which to place the cartridges by hand. The magazine, which fits into a slot cut in the stock under the opening in the body, is held in position by a catch. This can be withdrawn by a small trigger in front of the main trigger, when the magazine is released. The magazine can only be filled by one cartridge at a time; those can be passed into it through the slot in the body of the breech if it is desired to fill the magazine when attached to the rifle. The spring (fig. 2, F) forced forces the cartridge up in the form of a coil flattened at the side. The rifle has two sets of sights, the ordinary back sight (fig. 2, Aa) being graduated to 1900 yards; but for longer ranges there is a pair of sights consisting of a dial sight (fig. 2, Bb) on the left side of the fore end of the stock, and a short arm (fig. 2, Bc) near the trigger, at the end of which is a small hole. The weight of the rifle is 9 lb. 6 oz., and length 49.5 inches. The

---

Fig. 2.—The Lee-Metford Magazine Rifle, Mark I.: A, rifle showing section of breech after four cartridges have been fired; B, part of rifle showing sights, &c.; C, section of barrel; D, E, magazine; F, magazine spring; G, cartridge.
bayonet, weighing 15 oz., is in the form of a short knife having a blade 12 inches long. The cartridge (fig. 2, G) for this rifle consists of a solid drawn brass cartridge-case, in which is inserted a pellet of 70 grains of compressed fine-grain powder. After insertion of the powder pellet the case is necked so as to reduce the diameter at the mouth of the case to 312 inches. The latest pattern of Lee-Metford rifle (Mark II.), issued in 1898, has various modifications, the principal being that the magazine holds ten cartridges instead of eight, and black powder is superseded by cordite.

The smallness of the bore necessitated a long bullet, in order to get the necessary weight, and a quick twist in the rifling; it was found that an ordinary hardened lead bullet could not stand the strain, and therefore the bullet, which weighs 215 grains, is composed of a hardened lead core inserted into an envelope of cupro-nickel turned over at the end to prevent the gas on the explosion of the pellet getting up between the envelope and lead core. The length of the bullet is 3.65 inches, and diameter 312 inch. It is pressed into the mouth of the cartridge-case, which holds it firmly. A packet of ten of these cartridges weighs 10 ounces. The muzzle velocity obtained with the powder pellets is 1380 ft.-seconds; but with the cordite powder about 2000 ft.-seconds. When firing at 900 yards' range the highest point of the trajectory above the line of sight is 5 feet, whereas that of the Enfield-Martini 40-bore rifle is 6 feet, and of the Martini-Henry 45-bore rifle 8 feet 7 inches.

But the English government was not the first to adopt a small-bore magazine rifle for the general armament of the whole army, the French having adopted the Lebel rifle as early as the year 1897. It has been already stated that the French navy had for some time previously been armed with the Kropatschek repeating rifle, having the magazine in the fore end of the stock; and, like the Germans, the French had converted their single loading Gras rifle into a repeater on the Kropatschek model. The Lebel is an improved Gras repeating rifle; the bore of the barrel is 315 inch. The magazine (fig. 3) is in the fore end of the stock, and holds eight cartridges. The points of the bullets are flattened to lessen the chance of accidental explosions in the tube, which might be caused by the cap of one cartridge resting on the point of the bullet of the cartridge in rear of it. The cartridge-case is charged with about 35 grains of smokeless powder, and the bullet weighs about 215 grains. The muzzle velocity is about 2000 ft.-seconds. Great results were expected from this rifle when first introduced; but experience has shown that the smokeless powder adopted for the Lebel cartridge is not reliable, and that after being kept a year or so it greatly deteriorates.

The Lebel rifle itself has proved inferior to one of a simpler construction, called the Berthier rifle after the name of the inventor. The breech mechanism is on the same principle as that of all other magazine arms—viz. the bolt containing the striking apparatus; but the magazine in the fore end of the stock is discarded, and the Mannlicher magazine adopted in its place. This consists of a light metal frame or clip holding five cartridges; the clip is dropped into a receptacle to hold it, but cannot drop through, as the bottom cartridge rests on a spring which forces the cartridges up, as in the case of the Lee magazine, and the clip is held up by the top cartridge, which presses against the turned-in sides of the clip. As soon as the last cartridge is fed into the barrel by the bolt there is nothing to hold up the clip, which then drops out, and on the withdrawal of the bolt another clip full of cartridges is inserted. There is a cut-off which enables the rifle to be used as a single loader. The bullet weighs 205 grains, and consists of a hardened lead core coated with a white metal envelope. The charge is 33 grains of smokeless powder. Ten cartridges weigh about 87 oz. The bore of the barrel is 301", and weight of arms 13½ lb. The muzzle velocity is 2070 ft.-seconds. The extreme simplicity in the mechanism of the bolt of this rifle is one of its chief recommendations. In Germany the original Mauser rifle, which had been converted into a magazine arm as a temporary measure, as already described, was, in 1888, superseded by one also the invention of Mauser, having a barrel with a bore of 315 inch, and in which the magazine is filled from a metal clip containing five cartridges, somewhat like the Mannlicher; but the clip or cartridge-holder does not itself pass into the receptacle made in the barrel, as in the Mannlicher; but, being held over the receptacle or magazine, the cartridges are pushed out of it by the thumb, and the clip itself falls off. The magazine rifles of other nations are all modifications of one or other of those already described; but there is a peculiarity in the construction of the Mauser and Mannlicher rifles which must be mentioned. This peculiarity consists in the barrel proper being encased in a barrel jacket or light steel cylinder, both being screwed into the body of the breech, and the use end of the barrel passing loosely through a thimble at the end of the barrel jacket. The sights are fixed to the barrel jacket. There is a very slight air-space between the barrel and the jacket, and the advantages claimed for the compound barrel are chiefly that the barrel proper is protected and is less liable to injury from a blow, and that the outer coating does not heat so rapidly as a barrel constructed in the ordinary way, and that therefore a handguard, such as is used with the English rifle, is not necessary. The Mannlicher and the Mauser both have a calibre of '315', and fire a bullet weighing 216 grains, the charge of smokeless powder being about 35 grains, and the muzzle velocity about 2000 ft.-seconds. In the hands of the Chilian Congressionalists the Mannlicher rifle contributed very largely to the defeat of Balmaceda in 1891.

**Fig. 4.—German Mauser Magazine Rifle, in section.**

**Fig. 3.—French Lebel Magazine Rifle, in section.**

**Sporting Rifles** have already been dealt with under the head of Breech-loading and Firearms (q.v.). But it may be as well to observe that the same principle or law governs the alteration made for the sporting as for the military rifle, only it is differently applied. In the military rifle a high
<table>
<thead>
<tr>
<th>Description of Arm.</th>
<th>Without Bayonet.</th>
<th>Barrel.</th>
<th>Ammunition.</th>
<th>Value of ( \frac{D}{W} )</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIFLRS</td>
<td>lb. oz.</td>
<td>ft. in.</td>
<td>lb.</td>
<td>in.</td>
</tr>
<tr>
<td>Baker [Pattern 1826]</td>
<td>9 9</td>
<td>3 2</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>Brunswick [Pattern 1851]</td>
<td>9 13</td>
<td>1 4</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>Enfield, Long. [Pattern 1853]</td>
<td>9 13</td>
<td>1 4</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>Snider [Pattern 1864]</td>
<td>9 3</td>
<td>4 1/2</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>Martini-Henry, Mark 111. [Pattern 1871]</td>
<td>9 0</td>
<td>4</td>
<td>1 1/2</td>
<td>6</td>
</tr>
<tr>
<td>Enfield-Martini [Pattern 1886]</td>
<td>9 13</td>
<td>1 4</td>
<td>6</td>
<td>579</td>
</tr>
<tr>
<td>Lee-Metford, Mark 11 [Pattern 1896]</td>
<td>9 6</td>
<td>4 1/2</td>
<td>6</td>
<td>579</td>
</tr>
</tbody>
</table>

MILITARY RIFLES IN USE IN THE PRINCIPAL ARMIES OF EUROPE AND IN THE UNITED STATES IMMEDIATELY PRECEDING THE ADOPTION OF MAGAZINE RIFLES.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria.</td>
<td>Wurm.</td>
<td>9 13</td>
<td>1 4</td>
<td>6</td>
<td>579</td>
<td>7</td>
<td>1 to 4</td>
</tr>
<tr>
<td>Germany.</td>
<td>Mauser.</td>
<td>Falling hinged block.</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>579</td>
<td>7</td>
</tr>
<tr>
<td>Italy.</td>
<td>Vetterli.</td>
<td>Falling hinged block.</td>
<td>10</td>
<td>4</td>
<td>1</td>
<td>579</td>
<td>7</td>
</tr>
</tbody>
</table>
Riflemen

velocity and great accuracy are required at moderately long ranges; it is therefore necessary to have a heavy bullet in proportion to its diameter. But in sporting rifles long range shooting is not required; the bullet can therefore be made very much lighter in proportion to its diameter. The charge of powder for the Martini-Henry cartridge is 85 grains, and weight of bullet 480 grains—proportion of powder to bullet, 1 to 5½; muzzle velocity, 1,320 ft. seconds; highest point of trajectory at 100 yards, 2½ inches; at 150 yards, nearly 7 inches. In the 450 Express the powder charge is 120 grains; weight of bullet, 260 grains; proportion of powder to bullet, 1 to 2½; muzzle velocity, over 2,000 ft. seconds; highest point of trajectory at 100 yards, 14 inch; at 150 yards, under 3 inches. In the year 1891 the troops of the countries enumerated below have been armed or re-armed with magazine rifles, and since then the United States, Norway and Sweden, and Russia have been supplied with small-bore arms. In the United States army the Krag-Jørgensen rifle (caliber .30) was adopted in 1892, and is in use by the regular army. But during the Spanish-American war (1898) the volunteer troops generally retained the Springfield.

MAGAZINE RIFLES IN USE.

<table>
<thead>
<tr>
<th>Country</th>
<th>Rifle</th>
<th>Weight</th>
<th>Calibre</th>
<th>Magazine</th>
<th>Rounds in Magazine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain</td>
<td>Enfield</td>
<td>10 lb. 12 oz.</td>
<td>.577</td>
<td>Fixed box</td>
<td>50</td>
</tr>
<tr>
<td>Great Britain</td>
<td>Lee-Enfield</td>
<td>10 lb. 12 oz.</td>
<td>.303</td>
<td>Fixed box</td>
<td>5</td>
</tr>
<tr>
<td>France</td>
<td>Mauser</td>
<td>9 lb. 9 oz.</td>
<td>.22</td>
<td>Tube</td>
<td>5</td>
</tr>
<tr>
<td>Germany</td>
<td>Mauser</td>
<td>9 lb. 9 oz.</td>
<td>.211</td>
<td>Fixed box</td>
<td>5</td>
</tr>
<tr>
<td>Japan</td>
<td>Vetterli</td>
<td>10 lb. 10 oz.</td>
<td>.405</td>
<td>Fixed box</td>
<td>5</td>
</tr>
</tbody>
</table>

For a more detailed account of the arms referred to in above article the reader is referred to "Armes à feu portatives," by Schmidt, in "Engineering," Nov. of February 6, March 6, April 3, and May 15, 1891, and "Treatise on Military Small-arms and Ammunition," by Lieut.-colonel Bond, R.A. See also the articles in this work on PANG-AMS, GUN, GUNNERY, PROJECTILES, VOLUNTEERS, &c.

Riflemen. All British infantry are now riflemen; but till 1854 rifles were the exception, the army generally having the smooth-bore "Brown Bess." During the Peninsular war the 60th and 95th Regiments armed themselves with long, light infantry drill, and clothed in dark green. The 95th became the "Rifle Brigade." The 60th are called "The King's Royal Rifle Corps." In 1881 the 26th and 90th were linked to form the "Scottish Rifles," and dressed in green; while the 88th and 80th Foot were formed into the "Royal Irish Rifles." See also VOLUNTEERS.

Riga, capital of Livonia, and next after St. Petersburg and Odessa the third seaport of Russia, lies on the Dvina (crossed here by a bridge of boats and a railway bridge) 7 miles from the mouth of the inlet of the Gulf, and 336 by rail SW. of St. Petersburg and Kavkoff. The old town has narrow streets and medieval houses and stores; but the suburbs are laid out in broad streets with handsome buildings. The chief edifices are the cathedral built in 1204, burned down in 1547, but rebuilt; St. Peter Church (1468), with a steeply 400 feet high; the pride of the city, the Knight's Sword, built 1494–1515, the former residence of the grand-master of the order; and several old guild houses and Hanseatic halls. It is the seat of an archbishop of the Greek Church. Its industries are rapidly growing; they turn out cottons, machines, tobacco, corks, spirits, oil, metal wares, glass, paper, flax, jute, and oil-cloth, and employ nearly 12,000 work-people. The exports reach an annual average of £5,560,000 (£2,396,000 in 1866), and embrace grain (average £1,433,000), timber (£1,175,000), flax (£1,077,000), linseed (£381,600), hemp and hemp-seed (£443,600), wool, hides, eggs, oil-cakes, and *pale hardwood*. The imports (iron and steel, coal, machinery, cotton, dye-woods, corkwood, herrings, manure, woolens, and wine) average £2,238,000 (£675,000 in 1866). Britain's share in this trade is represented by an average of £2,604,000 for exports and £2,785,380 for imports. This port, which is closed by ice for three to four months in the winter, is entered by an average of 2,900 vessels of 1,047,915 tons every year, of which 625 of 484,500 tons are British. Riga has grown from 102,698 inhabitants in 1867 to 169,329 in 1881, and 181,885 in 1891. Nearly one half are Germans (with German-speaking Jews), one-fourth Russians, and one-fourth Letts. Riga was founded in 1201 by Albert, Bishop of Livonia, and soon became a first-rate commercial town, and member of the Hanseatic League. It belonged to Poland from 1561, and in 1621 was annexed to Sweden, and in 1710 was finally annexed to Russia.

The GULF OF RIGA is an inlet on the east side of the Baltic Sea, which washes the shores of Courland, Livonia, and Estonia. It is 106 miles in length from north to south, and about 60 in breadth. The bays and inlets of Courland, which open athwart the entrance. The chief river which falls into the gulf is the Dvina. Sandbanks render navigation in some parts dangerous.

Right. See RIGI.

Right Ascension. See ASCENSION (Right).

Right-handedness is no doubt due to the lack of perfect symmetry in the human body. If the latter could be folded over from a medial line so that each organ of the one side fell exactly upon a corresponding organ of the other, the brain and its associated structure highly favourably, mechanically, to the equal use of each limb, and ambidextrous individuals would be the rule, not the exception. If a vertical line be drawn dividing the body it will be found that the centre of gravity is a little to the right of this median line. This unbalanced condition. From a series of experiments the greater weight has been estimated at about 15 ounces. Upon this fact is founded the mechanical theory of right-handedness, or the predominance of the right hand over the left; or, more generally, of the limbs of the right side over those of the left, shifting the centre of gravity farther to that side. In violent muscular exertion there is more air proportionally inhaled by the lung of the side which sustains the exertion. Normally about 230 cubic inches of air are contained by the lungs, of which the right holds 20 inches more than the left. Under exertion of the right side the larger lung is better filled than the smaller, and the centre of gravity is removed until it is found in a line passing through the right foot; so that the right leg and foot afford a steadier basis of support than the left would do under similar circumstances. Which ever leg and foot use the arm of that side to greater advantage, and thus, through the greater use of the right lower limb, the right upper limb comes to be preferred.

Professor Buchanan's theory also explains the almost universal habit of carrying the left arm on the left shoulder. In the case of a light weight, slung on the arm, the equilibrium of the body is better.
RIGHT-HANDEDNESS

maintained by carrying it on the left side. If the weight be a heavy one, borne on the left shoulder, the burden is really being supported very much by the right limb, owing to the natural curve of the body towards the right side, while supporting it on the right shoulder.

But, it may be argued, if this theory covers the case, then left-handedness, which is certainly inherited, cannot be accounted for except on the extraordinary supposition of transference of the viscera. In a very few cases left-handedness has been found to accompany such a transposition. Strange to say the liver has been found on the left side, and the heart, stomach, and spleen on the right without any derangement to the health of the subject, even from the point of view of a life-insurance company. Nevertheless, the number of cases of genuine left-handedness far exceeds such instances of transposition. An explanation of left-handedness in normal structures has been sought by falling back on the fact that the cerebral hemispheres of the brain work the muscles cross-wise. Forer's researches have proved that when we wade with the right eye we see with the left side of the brain. Another curious and instructive fact is that, although an animal be rendered blind of an eye by the destruction of a convolution on one side of the brain, the blindness is temporary. Soon the other hemisphere comes into action, and the animal sees with the right eye.

Viewed in this light, hereditary left-handedness may be due to the greater development of the right side of the brain. Suppose accident, or the emnity of the conqueror, had deprived a comparatively young archer of his right hand or right eye (the latter cruel custom is referred to in the Bible), then the left hand, governed by the right hemisphere, being called into work would react on that hemisphere, whose blood-vessels would be often replenished all whose strength and senses would grow. It is not too much to assume that in some cases this improved power of the right hemisphere might be transmitted to a descendant. It is practically certain, says Dr. Bastian, that the great preponderance of right-handed movements in ordinary life and of folk-tales and superstitions in the complex organisation of the left and the right hemisphere. M. Broca states that in forty brains he examined he found the left frontal lobe heavier than the right. These investigations have not yet been thoroughly carried out; but possibly the explanation of the obstinate left-handedness lies in that direction.

In connection with the evolution of the species right-handedness, in all probability, has been a late acquisition. The body is more symmetrical in early youth, and is more symmetrical in the female than in the male. A very young child betrays no disposition to use the right hand more than the left. The habit of using the right hand gradually increases with boyhood, and boys have to the last a wider range with the right hand than girls, who are proverbially left-handed. M. Hitherto, however, the oldest records of the human race, even when man was hewn with a flint point on the bones of extinct animals, prove him to have been a right-handed being. His profiles are then sketched with faces toward the left, just as a street arab chief does a horse in the meltings. Hence, the primeval left-handed artist only paints himself. Bronze weapons are the weapons of right-handed individuals; witness the curious yewtree handle of a bronze sickle fished up from the lake of Brienne, Switzerland, quite intact and inscribed "Left-handed artist," says Sir Daniel Wilson, "of being used by a left-handed swordsman as our present mower's scythe."

A few observers of the habits of savages have remarked that left-handed individuals were proportionally more numerous among them. This is what we should expect from the enormous additional demands made by civilisation, its manners, and its tools upon the activity of the right hand. It is only required that one should sit at a bench to see how planes, screws, &c., are fashioned to suit that member. In drawing a pattern of small repeating character we begin, as we begin to write a page, at the top left-hand side, so as to avoid placing fingers on the still undried pigments. Military drill, table-laying, and the use of plug tobacco, as any, the tyrannous fashion, all urge on the right hand in the path of greater dexterity, leaving the left as the inept drudge whose duty it is merely to assist. No wonder the right has acquired strength, size, greater tactile sensibility, and greater resistance of the extremes of heat and cold. Naturalists, who observe that adult monkeys catch nuts more with the right hand, that the African elephant digs more with the right task, or that the Carolina parrot has a preferential claw for grasping, tell us that these habits are subject to numerous exceptions. It is the exception of left-handedness with human beings. Egyptian and Assyrian painting and sculpture and Etruscan bronze also elucidate the general law that burdens have been assigned to the left shoulder; so that the position of the shepherd's plaid is nowise a thing ascribed to the hand. In the heavens, the protective blanket-like toga of the Etruscans covers the left shoulder, and is wrapped under the right arm to allow of the freer motion of that arm.

Use and disuse, by strengthening or weakening organs, would warrant us in believing that where there is inequality of vision between one eye the balance would be thrown in favour of the right. As Sir John Herschell has remarked, cases can be adduced of persons who were unaware of one of their eyes being weak almost to blindness until for doing some arduous work in which the left eye was required, the right eye, inherited from a grandfather short-sighted in both, the defect of which he did not discover until far advanced in manhood. It is well to know that such disparity in power of vision can be greatly mitigated by the lenses of the optician. A good deal of the dexterity of the right and left hands. The rule of the road and the interpretation of omens tell, by the contrary rule obtaining in nations of different race, no small part of their story as to whether they belong to the conquerors or the conquered. See Sir Daniel Wilson's "The Brain; its Functions. In "The Right of Way", under Professor Dwight in "Scribner's Magazine" (April 1891); also the article "Brain", Vol. II. pp. 391, 392.

Right, CLAIM OF. See FREE CHURCH.

Right of Way, the right which the public has to the free passage over roads or tracks. The expression is more generally applied to those public routes which are not statutory roads, such as hill or field paths, drove roads, bridle and other paths, and cart or driving roads in the common use of the public, which are not kept up by the county authorities. In many instances these roads are the only means of communication between important districts; and generally they are the shorter, and often the more picturesque, ways from one point to another. Right of way also exists along the seashore for the backs of the banks of New Hampshire. The law of rights of way is judicial and not statutory.

In Scotland, where of late the chief causes célèbres have originated, forty years' continuous use by the public of such roads or paths is the prescriptive period for constituting a right of way; while in England the public house "The Right of Way" under dedication to them by the owner of the soil, and user signifying their acceptance of the same, or when dedication can fairly be assumed from
notorious user, which needs generally to be proved for a lengthened period, but which may yet, according to circumstances, be presumed from a period of user of only a few years. The following paragraph, from a statute passed in 1888, which enacts that county councils 'may, if they think fit, contribute towards the costs of the maintenance, repair, enlargement, and improvement of any highway or public footpath in the county, although the same is not a main road.'

In Scotland and England influential societies exist for the purpose of assisting in the protection of public rights of way—viz. the Scottish Rights of Way and Recreation Society, Edinburgh, founded in 1844 and reconstituted in 1884, and the National Footpath Preservation Society, London, founded in 1894. There are also several societies for special districts. Bills have since 1888 been introduced into the House of Commons by private members with the object of charging a public authority with the duty of protecting and maintaining rights of way, but no legislative measure has yet been passed. See also the article on the law of highways at Roads. For right of way on the Norfolk Broads, see Walter Rye, Fishing, Shooting, and Sailing on the Norfolk Broads (Norwich, 1891).

Rights. Declaration and Bill of. The Convention Parliament which called the Prince and Princess of Orange to the throne of England sat forth. In a way, the law of property, and of course the right of redress, is not the law of highways at Roads. For right of way on the Norfolk Broads, see Walter Rye, Fishing, Shooting, and Sailing on the Norfolk Broads (Norwich, 1891).

Rights. Declaration and Bill of. The Convention Parliament which called the Prince and Princess of Orange to the throne of England sat forth. In a way, the law of property, and of course the right of redress, is not the law of highways at Roads. For right of way on the Norfolk Broads, see Walter Rye, Fishing, Shooting, and Sailing on the Norfolk Broads (Norwich, 1891).

Rights. Declaration and Bill of. The Convention Parliament which called the Prince and Princess of Orange to the throne of England sat forth. In a way, the law of property, and of course the right of redress, is not the law of highways at Roads. For right of way on the Norfolk Broads, see Walter Rye, Fishing, Shooting, and Sailing on the Norfolk Broads (Norwich, 1891).

Rights. Declaration and Bill of. The Convention Parliament which called the Prince and Princess of Orange to the throne of England sat forth. In a way, the law of property, and of course the right of redress, is not the law of highways at Roads. For right of way on the Norfolk Broads, see Walter Rye, Fishing, Shooting, and Sailing on the Norfolk Broads (Norwich, 1891).

RIGIDITY
RING

RIGOR MORTIS

abstract dynamics a rigid system is a collocation of particles which, however much they may move as a whole, never alter their mutual relative positions. Such a system has no true physical existence, since there is no known substance which can nearly do this. Nevertheless there are those substances which yield but slightly to deforming stresses—all solids practically—are regarded as possessing a certain rigidity, which is measured by the ratio of the deforming stress to the deformation produced. The greater this ratio is, the greater the rigidity. This condition is the ideal rigid body, whose behaviour under the action of forces forms the subject-matter of what is usually called Rigid Dynamics. The property of rigidity itself, as described above, fails to be discussed under the general subject of elasticity. Of ordinary substances steel possesses the highest rigidity. See ELASTICITY, ETHIC, MATTER.

Rigor Mortis. See DEATH.

Rigveda. See RELIGION.

Rilke. See THEODOR.

Rimini, a city of Italy, stands on the shore of the Adriatic, 69 miles by sea northeast of Bologna; it is still marked with its ancient walls, and contains many medieval buildings. The cathedral, the temple altered and rebuilt to commemorate the unhallowed love of Sigismundo Malatesta and Isotta degli Atti, a beautiful Renaissance structure, dates from 1440-50; the church of St Giovanni Battista contains many religious pictures. The Romanesque castle of Malatesta is now used as a prison. The little river on which the city stands is spanned by a white marble Roman bridge, 256 feet long, with five arches. Beside one of the gates stands the triumphal arch, 46 feet high, erected in honour of Augustus. The spot where Caesar stood to address his soldiers after crossing the Rubicon (about 10 miles NW. of Rimini) is marked in one of the squares by a monumental pillar. The city manufactures silk and salt. (See POP. 10,638, with suburbs 19,158. One of these suburbs, half a mile distant on the seashore, is much visited for sea-bathing. Originally an Umbrian, and then for several centuries an Etrocan city, Rimini (Arin- inia) fell into the hands of Rome in 264 B.C. They made it the northern terminus of the Flaminian Way from Rome, and the southern terminus of the Emilian Way to Piacenza and of the Popilian Way to Venice, and utilised the advantages of its position as a seaport for communicating with the east side of the Adriatic. After being battled for by Goths and Byzantines, and held by the latter, the Lombards, and the Franks, it became a shuttlecock between the emperor and the pope. At last, weary of this alternation of masters, neither of whom profited her, Rimini put herself under the protection of the House of Malatesta (1287), whose chiefs soon made themselves absolute masters of her fortunes. Amongst the tragic episodes that marked the family history of these rulers may be mentioned the killing of Francesca (q.v.) da Rimini and her lover by her brother, and the murder of John of Byrrhus, the object of Byrrhus's project of Byzantium's conquest. The most famous, or rather infamous, member of the family was Sigismundo (1417-68), a brave and skillful soldier, a scholar, a patron of the fine arts, but a man of brutal animal passions, and with no sense of right and wrong. The head of the house sold his rights over Rimini to the Venetians in 1593; but the pope wrested them to himself in 1598, and kept them until 1860. See Vriate's Un Condottiere au XV. Siecle: Rimini (1882).

Rimouski, a Canadian town, stands on the south shore of the St Lawrence, at the influx of the Rimouski River, 182 miles by rail NE. of Quebec. It is the seat of a bishop, a summer watering-place, and a telegraph station for arrivals and departures of ships. Pop. 1417.

Rinderpest. See CATTLE-PLAGUE.

Ring (Sax. ring or hrung) is any circle or section of a cylinder. Rings of gold, silver, and of other metals and materials have been worn in all times and countries, and while they have been used to decorate the ears, nose, lips, arms, legs, and toes, finger-rings have always occupied the most important and significant place among such ornaments. From the earliest period of civilised relationships the finger-ring was a convenient means for carrying the signet of its wearer. In Genesis, xxxviii. 17, 18, we read that Judah left his signet as a pledge with his daughter-in-law; and in chap. xii. 42 it is narrated that Pharaoh delivered to Joseph his royal signet as a token of deputed power and authority. From the fact that these ancient rings carried engraved signets early ring-lores is intimately mixed up with the origin and development of gem and seal engraving. Heroic tales mention the wearing of finger-rings by the Babylonians, and from Asia the habit probably passed into Greece, although the Homeric poems mention ear-rings alone. In the later Greek legends the ancient heroes are described as wearing rings, and every freeman throughout Greece seems afterwards to have possessed one. The Life of Alexander says that the Romans are said to have derived the use of rings from the Sabines; their rings were at first, as those of the Greeks, signet-rings, but made of iron. Every free Roman had a right to wear one; and down to the close of the republic the iron ring was worn by those who affected the simplicity of old times. Ambassadors, in the early age of the republic, wore gold rings as a part of their official dress—a custom afterwards extended to senators, chief-magistrates, and in later times to the equites, who were said to wear aurei their rings, anulii aurei, from which other persons were excluded. It became customary for the emperors to confer the golden ring on whom they pleased, and the privilege grew gradually more and more extensive, till Justinian embraced within it all citizens of the empire, whether singeni or libertini. Rings entered into the groundwork of many oriental superstitions, as in the legend of Solomon's ring, which, among its many magical virtues, enabled the monarch to triumph over all opponents, and daily to transport himself to the celestial spheres, where he learned the secrets of the universe. The Greeks mention various rings endowed with magic power, as that of Gyges, which rendered him invisible when its stone was turned inwards; and in old Saxon romances a similar ring legend is incorporated. The ring of Polvercates (q.v.), which was flung into the sea to propitiate Nemesis, was found by its owner inside a fish; and there were persons who made lucrative traffic of selling charmed rings, worn for the most part by the lower classes. By many Mussulmans at the present day a ring having enclosed in it a verse from the Koran is worn as an amulet.
Various explanations have been given of the connection of the ring with marriage. It would appear that wedding-rings were worn by the Jews prior to Christian times. Fig. 1 shows a Jewish marriage-ring beautifully wrought in gold filigree, and richly enamelled, now in the possession of Lord Londesborough. It has been said that as the delivery of the signet-ring to any one was a sign of deputing or sharing of authority, so the delivery of a ring by husband to wife indicated her admittance to share his rights and privileges. In pagan times in Europe the ring seems to have been connected with fidelity or with espousals. Fig. 2 shows a form of betrothal-ring called a gimmel, or linked ring, which was used in later times; the upper fig. shows the three parts brought together, the lower fig. the parts separately. By an ancient Norse custom, described in the Eyrbyggia Saga, when an oath was imposed, he by whom it was pledged passed his hand through a silver ring, sacred to that ceremony; and in Iceland the ceremony of betrothal used to be accompanied by the bridegroom passing his four fingers and thumb through a large ring, and in this manner receiving the hand of the bride, as is represented in a woodcut in an old edition of Olaus Magnus. As lately as 1780 the practice existed in Orkney of a man and woman plighting their faith at the Standing Stones of Stenness by joining their hands through the perforated Stone of Odin. For betrothal, as well as for marriage, a ring is commonly bestowed; and in many countries both spouses wear wedding-rings. Although the third finger of the left hand is the official finger, rings are worn on all fingers, and in medieval times even the thumbs were frequently decorated with large and massive rings. During the 16th, 17th, and 18th centuries it was a very common practice to have mottoes inscribed on rings (fig. 3), including wedding-rings, and the motto was called the posy or chummon. The ring was the symbol of the dominion of Venice over the Adriatic; and yearly, on Ascension Day, a ring was thrown by the Doge from the ship Bucentaur into the sea, to denote that as the wife is subject to her husband, so is the Adriatic Sea to the republic of Venice. The reception of a ring forms an essential feature in the investiture of many Catholic dignitaries; and even in the Anglican communion a sapphire 'pontifical' ring was presented in September 1891 to the new Archbishop of York. The 'fisherman's ring,' containing an engraved representation of St. Peter in an ancient fishing-boat, is the official ring of investiture of the pope. It is broken and remade on the death of each pontiff, and when presented to the new head of the church he declares the name under which he desires to rule, which name is thereafter engraved on it. Cardinals on their elevation receive a sapphire ring, and bishops, a gold ring invested with a special ring. The reception of novices into Catholic sisterhoods is accompanied with the presentation of a ring, which is worn as a badge of espousal to the church. In the investiture of sovereigns the ring also occupies an important position in the ceremony. In addition to these, special rings were formerly worn by sergeants-at-law, who also on receiving silk made presents to various functionaries of rings (100 sometimes, costing £55 in all, cf. Notes and Queries, 1884). Moreover, the knightly orders, Masonic bodies, and many individuals employed for enabling them to claim the privileges of their orders or to facilitate their business. The carrying of seals attached to the watch-chain in the first place, and next the introduction of gummed envelopes, have had no small influence in decreasing the official importance of rings.

See the article Gem: Finger-ring Lore, by W. Jones (1877), an elaborate compilation of the practices, superstitions, and traditions connected with rings. See also King's Antique Gems and Rings (1872); History and Poetry of Finger-rings, by C. Edwards (New York, 1880); articles by Waterton, Forthom, and others in Archaeological Journal; and F. Schneider, Die Gestaltung des Ringes vom Mittelalter bis in die Neuzeit (Mainz, 1878).

Ringan. St. See Ninian.

Ringbones. This term is applied to ossuous or bony growths which are found upon the upper and lower pastern bones of the horse. They are of two kinds, true and false. The false ringbone is an exostosis situated above the middle of the long pastern bone, and as a rule gives no inconvenience, and unless very large is not looked upon as an unsoundness. The true ringbones, which are of two kinds—viz. high and low—are always to be considered as constituting an unsoundness of the gravest character, involving the articular ends of the bones, and giving rise to obstilinate and often incurable lamenesses. The high ringbone involves the pastern joint, and the low ringbone the coffin joint, and is partly within the horned foot; in many cases both high and low ringbones are coexistent. Ringbones vary in size, but the degree of lameness does not depend upon the mere size of the new formation. Very often the 'ring' may be a mere segment appearing only upon the side of the limb; in other cases it may completely envelop the whole circumference. As a consequence, ringbones are hereditary, and it is unsafe to breed from an animal having a ringbone.

The treatment should be complete rest, fomentations and poultices at first, and afterwards blistering, firing; and in cases that do not give way to these remedies the 'nerve operation' should be performed.

Ring-dove. See Pigeon.

Ring Money. In early commerce, before the invention of coinage, but after the inconveniences of direct barter became evident, the precious metals in the form of rings and other personal ornaments were used as a medium of exchange. The employment of gold and silver as currency in this form among the early Egyptians is proved by contemporary representations of rings, and the exorbitant price of gold and silver rings, one such picture occurring in the decorations of a rock-grotto associated with the cartouche of Amenophis II. The allusion also in Genesis, xxlii. 21, to the sons of Jacob finding their money 'in full weight' in the mouth of their sacks, may be taken as indicative of such a currency at a time when coinage of
RING OZEL

RINGWORM

279

definite weight and value did not exist. A similar currency appears to have been in use among certain western communities at a much later period. A Norse law made about 1290 alludes to an established ring money, of which, however, each ring was of definite weight. It has been suggested that many ancient Celtic ornaments of gold and silver had a definite weight and value to fit them for exchange purposes; but, while it is certain that these objects served both for personal adornment and for purposes of traffic, it has not been proved that they were made to any standard of weight or value. Caesar mentions that in Gaul and Britain gold and silver rings were used as money. Among the modifications of ring money in use in different countries may be mentioned the silver fish-hook money of Ceylon, mentioned by Tavernier, of the form of a flat wire bent into a hook, and issued as late as 1650. At the present day ring money for African traders is regularly manufactured at Birmingham of copper, or an alloy of copper, and is known under the name of ‘Manillas.’

Ring Ozel (Turdus torquatus, or Meraea torquata), a species of thrush, rather larger than a blackbird. It is a native chiefly of the western parts of Europe; it spends the winter in the south of Europe, Northern Africa, Syria, and Persia, and visits more northern regions in summer. It occurs frequently in many parts of the British Islands, where it breeds even in the Orkneys, but in very few districts does it remain all the year round. It is seldom seen in the more cultivated and thickly-peopled districts, preferring mountains, heaths, and their vicinity. It begins to breed in the later part of April, and makes its nest generally in healthy banks, often under a bush.

Ringworm (Tinea tonsurans) is a disease dependent on the presence of a parasitic fungus, known to botanists as the Trichophyton tonsurans, and discovered in 1844 by Malmsten. The fungus consists of a mycelium, or network of threadlike filaments, with oval, transparent spores, about tenth of a millimetre in diameter, for the most part connected in chains, but sometimes isolated. When found on the surface of the body the fungus grows in the epidermis; but on the scalp, where it is most common, it is chiefly seated in the interior of the hair-roots. The diseased hairs lose their elasticity and break when they have risen a line or two above the scalp.

Ringworm of the Body (Tinea circinata; Tinea marginitata) first appears as a rose-coloured and slightly-elevated spot about the size of a threepenny-piece, on which a bran-like desquamation of epidermis soon begins, accompanied by slight itching. This spot gradually increases in size, but retains its circular form; and as it extends, the healing process commences at the centre, so that the circular red patch is converted into a ring, enclosing a portion of healthy skin; and a ring thus formed may continue to expand until it reaches a diameter of four inches, or even more. It is apt to affect the face, the neck, the back, and the outside of the wrist. This form of ringworm frequently terminates spontaneously.

Ringworm of the Scalp (Tinea tonsurans) usually occurs in children, and is especially prevalent when the nutrition is defective, or there is a scrofulous taint in the constitution. In infants, and after the age of puberty, it is rare, and can usually be readily cured. It appears in the form of round, scaly, irritable patches, of different parts of the scalp, and the irritation often occasions the formation of minute vesicles. The hairs at these spots become dry and twisted, and are easily removed, but when the disease advances they break close to the scalp if an attempt is made to extract them. The scabs, and the epidermis surrounding them, become covered with a characteristic grayish-white powder, consisting of the spores of the fungus. The diseased parts are slightly elevated and puffy, and differ from the healthy scalp in colour, being bluish or blackened in different parts of the scalp. The grayish red or yellow in fair patients. The inflammation will last as long as the growth of the fungi continues; and even when they die spontaneously, as sometimes occurs, the affected spots may become bald in consequence of the hair-bulbs becoming atrophied. This condition, however, generally passes off in time. In some children only single hairs here and there may become or remain affected, and such cases are particularly apt to lead to the spread of the disease, because they are difficult to detect, and often escape recognition.

Ringworm is also sometimes met with in the beard, giving rise to one form of the troublesome disease known as Sycosis. Ringworm is extremely contagious; and when a case of it occurs in a family or a school, precautions are necessary to prevent its spreading to others. The greatest care should be taken that no brushes, sponges, towels, caps, &c. touched by the patient are used by others. The hair should be kept short, and the scalp anointed daily with carbolic oil, 1 in 20; a cap of linseed or oilseed should be worn night and day; and whatever remedy is selected should be steadily and perseveringly applied. No child with ringworm should be allowed to go to school, unless under very special precautions, nor to the hatter or hairdresser; and intercourse with other children
should be permitted as little as possible except in the open air.

Treatment.—Ringworm of the body is usually not difficult to cure. The application of soap or ammoniated mercury, or precipitated caustic, solution of sulphurous acid, tincture of iodine, usually quickly kills the parasite and so ends the disease. Ringworm of the scalp, on the other hand, is often an extremely intractable affection, because the parasite extends deep into the hair-follicles, and it is very difficult to bring the remedies employed satisfactorily in contact with it in this situation. In recent cases the remedies recommended above are often effectual; but those which have become chronic sometimes tax the ingenuity of the physician and the patience of the nurse to the utmost, and magnificent years make the soil unfavourable for the further propagation of the parasite.

Ringworm in the lower animals, as in the human subject, consists of the growth of a vegetable fungus on the surface of the skin, is common amongst young animals, is decidedly contagious, and communicated readily to the lower animals, and probably, also, from the lower animals to man. Commencing with a small itchy spot, usually about the head or neck, or root of the tail, it soon spreads, producing numerous scurfy circular bald patches. It is unaccompanied by fever or discharge intermixed with silver foam, with health. After washing with soap and water, run over the spots lightly every day with a pencil of nitrate of silver, or rub in a little of the red ointment of mercury, or some boile of sulphur liniment. See works by A. Smith (3d ed. 1855) and G. thin (1867).

Riobamba. See Cañar. 487.

Río Bravo. See Río Grande.

Río Cuarto, the second city in the Argentine province of Córdoba, formerly called Concepción, occupies an important strategic situation on the river of the same name, 500 miles NW. of Buenos Ayres and 170 mi by r. of S. of Córdoba. Pop. 12,000.

Río de Janeiro, a maritime state of Brazil, lying between Espirito Santo, Minas Geraes, and São Paulo. Area, 20,927 sq. m.; pop. without the municipality of 6,496,000. The province is low and swampy, the interior mountainous and healthy; the chief ranges are the Serras dos Orgãos (3700 feet) and da Mantiqueira in the extreme west (8900). The principal river is the Paraíba. There are still considerable forests, though they have been largely cleared, yielding a famous and highly valued cultural product, and after that sugar and cotton. Sugar-houses, distilleries, breweries, and manufactories of cottons, hats, and cigars are numerous. The state contains iron, kaolin, marble, &c. The capital is Niteróy, on the Bay of Pría Grande; with São Domingo and Pría Grande it has 20,000 inhabitants. The German colonies in the state have a pop. of over 15,000.

Río de Janeiro, the capital of Brazil, stands on the west side of one of the most magnificent natural harbours in the world. An inlet of the Atlantic, the bay of Río de Janeiro runs northwards for some 15 miles, varying in width from 2 miles to 7; it is girdled on all sides by picturesque mountains, covered with tropical vegetation. The entrance, which is less than a mile wide, passes between two bold headlands, on one of which is a steep conical mesa called the Sugar-loaf (1270 feet). The city, which lies on the south-western side of this mesa along the shore, climbing up the numerous irregular summits and dipping into the little green valleys between them, whilst great mountain-ranges (1500 to 3000 feet) shut in the background. About 3 miles SW. of the city stands the precipitous mass of Corcovado (2330 feet), up which a cog railway carries 50,000 visitors every year to enjoy the magnificent view. The streets are mostly narrow and often mean, and the houses and public buildings, though generally quaint and gay with colour, are insufficiently disposed for the general architectural features. Although Río has few magnificent public buildings, it possesses very useful public institutions, as the vast hospital of La Misericordia (1200 patients), the national library (1807), with nearly 150,000 volumes, the national museum (with unique collections), the large botanical asylum (1841) at the suburb of Botafogo, the botanical gardens with a celebrated avenue of palms (beyond Botafogo), the observatory, the Geographical and Historical Institute (1838), the former royal palace at São Christoão, the arsenal, the naval dockyards, and the Casa de Ornithologia, a school of medicine, a ‘Pasteur’ institute, a conservatory of music, a polytechnic school, &c. In spite of a good water-supply, chiefly by an aqueduct (1750) 12 miles long, and a new system of sewage-draining, the city is not very healthy; the surrounding hills shut out the breezes, and the heat grows intense in summer. Yellow fever prevails during the hot season; and the Negro population suffers from smallpox. Pop. (1872) 274,972; (1890) 322,631, including many foreigners—Portuguese, British, French, and Germans.

Río de Janeiro, the capital, sending out 51 per cent. of the total exports of the country, and bringing in 45 per cent. of the imports. The exports average £10,800,000 a year in value, all except about half a million sterling being for coffee; of the total, £5,500,000 go to the United States, more than £1,000,000 to Germany; Great Britain buys £500,000 less than France and Austria. The imports, chiefly cotton, gold and silver, metals, wool, provisions, and machinery, average about £12,700,000 a year. Great Britain supplies 51 millions sterling of this, Uruguay and Argentina are responsible for 34 millions, France close upon 2 millions, and Germany nearly 1½ million. The whole sea-frontage of the city is lined with quays, and in 1889 extensive new harbour-works were begun, embracing a dock of 75 acres, a breakwater 2300 yards long, an elevated railway, etc. (1894), which cost £22,000,000. It has 15 docks every year some 1500 vessels of 1,674,000 tons, about one-third (514,000 tons) British. The city possesses cotton, jute, and silk mills, tobacco and hat factories, machine-shops, tanneries, &c.

On 1st January 1831 a Portuguese captain, Alphonse de Souza, crossed the river-thinking it was the mouth of a large river he called it Río de Janeiro—i.e. January River. The French established themselves on one of its islands (Vileigagomin) in 1555; but they were driven away by the Portuguese in 1567. Río was founded in the preceding year; was plundered by Dugny-Trouin in 1711; supplanted Bahia as the capital of the viceroy in 1763; and in 1822 was made the capital of the empire of Brazil. The revolution of 15th November 1889, which transformed the empire into a republic, centred in Rio; and its bay was the scene of most of the naval fighting in the civil war of 1893-94. The federal district in which the city stands (area, 539 sq. m.; pop. 900,000) is administered directly by the federal authorities.

Río Grande, also Río Grande del Norte, and Río Bravo del Norte, a large river of North America, rises in the Southern Mountains of Colorado, and flows generally south-eastward into the Gulf of Mexico, forming on its way the entire boundary between Texas and Mexico. Its length is about 1800 miles; it is for the most part a shallow stream, but small steamboats can ascend for nearly 500 miles. Its valley is affluent to the Rio Pecos. See also, for other Río Grandes, PARÁNA and SENEGAMBIA.
Rio Grande do Norte, a maritime state of Brazil, occupies the north-east angle of the country, and is bounded on the N. and E. by the Atlantic. Area, 22,193 sq. m.; pop. (1890) 268,273, one-half Indians. It derives its name from the river Rio Grande, which flows into the Atlantic at the eastern part of the state but is not navigable by vessels of war; and the principal river is the Piranhas. The surface is flat along the shores, which are skirted by dangerous shoals and reefs, but is mountainous in the interior. The principal crops are sugar and cotton; large herds of horses and cattle are reared on the extensive pasture lands.

Rio Grande do Sul, the southernmost state of Brazil, is bounded on the N. and W. by the river Uruguay, on the S. by the republic of Uruguay, and on the E. by the Atlantic. Area, 91,310 sq. m.; pop. (1890) 337,435, of whom 100,000 are Germans and 52,000 Italians. The northern portion of the state consists of an elevated plateau, the edges of which are heavily timbered; the southern half is a rolling grassy plain, on which large numbers of cattle are kept. The climate is healthy, well suited for vegetables and the Germans and the Italians have established large and prosperous colonies here. All the cereals and fruits of central Europe can be grown advantageously, and the inhabitants are awakening to the importance of developing the immense agricultural resources of the state. The principal towns are Porto Alegre (q.v.), the capital, and Pelotas.

Along the coast stretch the two lagoons, Dos Patos (174 miles long by 34 wide) and Mirim, connected by a navigable channel. The principal articles of export are beans, horca, beans, tobacco, jerked beef, tallow, and manioc flour, reaching nearly half a million steliers in value. The imports, valued at 14 million pounds sterling, consist of cotton, woolen, and linen manufactures, coal, earthenware, and hardware. The principal towns are Porto Alegre (q.v.), the capital, and Pelotas.

The town of Rio Grande stands on the southern shore of the strait leading into the southern end of the Lago dos Patos. Pop. 18,000. In January 1891 a beginning was made with the work of removing the sand-bar that obstructs the entrance, the intention being to deepen the harbor and even make Rio Grande a great port for southern Brazil.

Rioja, a western province of the Argentine Republic, with an area of 34,365 sq. m. and a pop. of about 80,000. Much of it is desert, but in the west there are very fertile Andes valleys, where wheat, maize, vines, cotton, and tropical fruits are grown. Copper, silver, and gold are mined.—Rioja, the capital, founded in 1591, lies at the foot of the Sierra Velasco, among orange groves and vine-clad hills, 350 miles by rail N.W. of Cordoba. Pop. 6000.

Riom, a town of France (dept. Puy-de-Dôme), is picturequely situated on a hill, 6 miles by rail N. of Clermont-Ferrand. It is a thriving agricultural market, and is a perfect preserve of domestic architecture, especially of the Renaissance period. There is considerable trade, and tobacco, linen, and machinery are manufactured. Pop. (1891) 11,169.

Rion. See PIASES.

Rio Negro. (1) one of the principal affluents of the Amazon River, rises as the Guainia in south-eastern Colombia, and then runs north-west into the Amazonas in Brazil, and then south into Amazonas in Brazil, and then east and south-east until it empties into the Marajo, after a course estimated at 1350 miles. Its chief tributary on the right is the Uaupes; on the left it receives the Casiquiare (q.v.). By means of which connexion it is possible to sail from the Casiquiare and the Amazon, and also the Cabaiburu, Branco, and other streams. It is over a mile broad when its clear, inky-black stream enters the yellow, muddy Amazon. A few miles from its mouth is Manáos (q.v.), on the left bank; and higher up the river opens into great lagoons, nearly choked with numerous islands. See A. R. Wallace's Travels on the Amazon and Rio Negro (1833).—(2) A river of Argentino, which rises in the Anolpe lake of the Neuquen (see Neuquen, N.W. of Santa Fé) and afterwards the Limay, and receives the name of Rio Negro at its junction with the Neuquen, after which it flows east and south-east into the Atlantic Ocean. It is over 500 miles long, and for small steamers is navigable all the way. Near its mouth are large open lagoons, where immense quantities of salt are collected. It flows on the north and gives its name to a national territory, formerly part of Patagonia, and now containing an area of 81,895 sq. m. of for the greater part level but barren soil. The chief town is Viuela (pop. 1500), 20 miles from the mouth of the Rio Negro.

Rionegro, a town of Colombia, in Antioquia, some 15 miles S.E. of Medellin. It was founded in 1545, and the National Convention met here in 1863. Pop. 9000.

Rionero, a town of Southern Italy, 12 miles N. of Potenza; it suffered greatly from earthquake in 1881. Pop. 1,150.

Riot consists in the joint unlawful action, by breach of the peace or by causing terror to the public, of three or more persons assembled together whether they originally assembled for these purposes or no. When a riot becomes formidable any justice of the peace may command the persons assembled, if not less than ten in number, to disperse peaceably by a form of words called reading the Riot Act (1 Geo. I. chap. 5), thus: 'Our Sovereign Lord the King (or Lady the Queen) chargeth and commandeth all persons being assembled immediately to disperse themselves, and peaceably to depart to their habitations or to their lawful business, upon the pains contained in an Act of King George for preventing tumults and riots assembled.—God save the King (or Queen).' (The omission of these last four words makes the reading a mere preliminary, to certify the understanding force in the prevention of serious outrages and damage to persons and property, it is not necessary to wait for the proclamation to be read, still less to wait for an hour after it has been read. Though death or wounds result to those composing the mob, such part is not deemed an excuse of the offense. The principal acts of felony, and liable to penal servitude for life. Prosecutions under the Riot Act must be commenced within twelve months of the time of committing the alleged offense. Sometimes the Riot Act is read more than once during the disturbance, in which case the second or third reading does not supersede the first. The Riot Damages Act, 1886, provides compensation from the rates to those whose property is damaged during a riot. Less serious than riot are unlawful assembly, a meeting of thirty persons or more for the purpose of committing an indictable offense, but where no part of the object is actually carried out; and rout, where the assembly proceeds to execute the act, but does not actually accomplish it: and affray, that is, a fight between two or more in some public place (e.g. a prize-fight), but it must not be premeditated. Of Course it is clear that in the case of any riot the police would be entitled to interfere and prevent the disturbance would be an assault. Among notable riots have been those in Scotland on account of the Union (1707); the Porteous Mob in Edinburgh (1736); Lord George Gordon’s ‘No Popery’ Riots (1780); at Birmingham (1791) in connection with the Common-Rights and Representation Bill. Another was the Reform Bill Riots at Bristol (1831); Chartist Riots (1838–39); Rebecca Riots in Wales (1843); religious riots at Belfast
Río Tinto, a river in southern Spain, in the province of Huelva, near whose sources are rich copper-mines; the annual output (copper and sulphur) reaches 1,400,000 tons; these minerals are exported from the port of Huelva, (q.v.), 45 miles distant by rail, near the mouth of the river. These mines were worked by the Romans—their Tharsis. During the years of Moorish supremacy they were unused, but they have been worked again since the middle of the 16th century. They were bought in 1841 by the London (Bremen) Syndicate for £4,000,000. Some 10,500 people are employed in the works, of whom unfortunately something like 10 per cent. are usually ill by reason of the unhealthiness of the work. See W. K. Lawson, Spain of To-day (1890).

Riouw, capital of the island of Bintang (q.v.) and headquarters of a Dutch residency comprising Bintang Islands, and large neighboring collieries and ironworks. Pop. (1851) 3671; (1891) 6815.—(2) A pretty village in the West Riding of Yorkshire, on the Nidd, 39 miles NNW. of Harrogate. Rebuilt in 1829-30, it has an hotel-de-ville (1854), an interesting church, and Ripley Castle (1555), where Cromwell is said to have slept the night before Marston Moor. Pop. 2091.

Ripley, George, was born at Groosfield, Massachusetts, 3d October 1802, graduated at Harvard in 1827, and was a member of the State legislature for three years, and was ordained to a pastorate in Boston. He held this till 1831. In the meantime he had joined actively in the Transcendental movement—the first meeting of the club was at his house in 1836; and on leaving the pulpit he at once started the Brook Farm (q.v.) experiment. This came to an end in 1847, and Ripley removed to New York, when he afterwards engaged in literary and journalistic work. He was joint-editor with Charles A. Dana of Appleton's New American Cyclopaedia. He died 4th July 1880. See Life by O. I. Frothingham in the 'American Men of Letters' series 1892.

Ripon, a city in the West Riding of Yorkshire, on the River Ure, 18 miles S.W. of York, 28 N. of Leeds, and 11 N. of Harrogate. A monastery, founded here in 660 by St Cuthbert and other monks of Melrose, was granted about 664 to St Wilfrid, who rebuilt the church with stone, and dedicated it to St Peter. Willibrord, the apostle of the Frisians, was buried in this monastery, which in 678 was made the seat of a short-lived bishopric, re-erected in 1836 after a lapse of more than ten centuries. The beautiful minster, which from the Conquest to the Dissolution was the church of Augustinian canons, was built between 1154 and 1520, so exhibits every variety of style from Transition-Norman to Perpendicular. A cruciform pile, 266 feet long, with three towers 120 feet high, which lost their spires in 1660, and with a Saxon crypt, where a hole called 'St Wilfrid's Needle' was anciently used as an ordeal of chivalry, it suffered much through the Scots (1319), decay, and vandalism, but restored by Sir G. G. Scott at a cost of £40,000. An obelisk, 90 feet high, in the market-place was erected in 1751 by W. Aislabie, for sixty years one of the two members for Ripon, whose representation was reduced to one in 1867, and merged in the county in 1885.

Ripon, Frederic John Robinson, Earl of, was born 1st November 1782, the second son of the second Lord Grantham. After graduating at Cambridge in 1804, he was attached to the diplomatic corps and served in various foreign countries. He returned to England in 1813, and was appointed Under-Secretary for the Colonies, a position he held until 1818. He was then appointed Secretary of State for India, a position he held until 1822. He was created Baron Grantham in 1822.

Ripon, Frederick John Robinson, Marquis of Ripon, was born 24th October 1827, and succeeded his father as Earl of Ripon and Viscount Goderich, his uncle as Earl de Grey, Baron Grantham, and a baronet. Since 1832 he had sat in parliament as a Liberal for Hull, Huddersfield, and the West Riding, and he became successively Under-secretary for War (1839), Under-secretary for India (1861), Secretary of State for India (1866), Lord President of the Council (1868), Grand-master of the Freemasons (1870, which office he resigned in 1874 on his conversion to Catholicism), Marquis of Ripon (1886), and was created Earl of Ripon and Viscount Goderich (1887), which title was popular with the natives, unpopular with Anglo-Indians, First Lord of the Admiralty in 1886, and Colonial Secretary in 1892-93.

Rip Van Winkle, the hero of Washington Irving's delightful sketch (1829), an idle, good-natured, heaped-scapes no, who neglects—he cannot be said to cultivate it—a patch of maize and potatoes in a small village near the Hudson River, and who, with his gun and dog Wolf, his companion in idleness, seeks a refuge from the scolding tongue of his sorely-tried but tenacious wife in the forests of the Catskill Mountains. There he falls in with Hendrick Hudson and his crew of the Half Moon, who are playing at ninemine in a secluded hollow, the balls as they roll echoing along the mountains like rumbling peals of thunder. Rip is directed to wait on them, and while doing so tastes and returns to the liquor he hands, till his senses forsake him. He wakens on a bright day, with the rusty firelock by his side; his beard has grown a foot long, and in the village he finds new buildings, new names over the doors, new faces at the windows. His own house is fallen into decay, his wife is dead—there is a drop of comfort, at least, in this intelligence—and he who went away a subject of George the Third has returned to find himself a free citizen of the United States. His
sleep, he discovers, has lasted twenty years, and meantime the American Revolution has passed and left all things changed. Rip, however, is recognized by some of his old acquaintances, finds a home at his daughter's house, and for many more years is as comfortable at the door of the new wooden Union Hotel as ever he was at old Nicholas Vedder's quiet Dutch inn. The story has been often dramatized, first in Germany, and a German edition has held the stage except Boucicault's (1865), with which the name of Joseph Jefferson is identified. The opera by Planquette (1882) also deserves mention, as keeping pretty closely to the story.

**Risshanger**

**WILLIAM,** a monk of St Albans, who styles himself 'chronigraphus' in an extant manuscript written by himself in 1312. He tells us, moreover, that he had been forty-one years a monk, and was then sixty-two years old, so that he must have been born in the year 1250. It has been usual to consider his chronica, which covers the period from 1259 to 1307, as a continuation of Matthew Paris, and it has been to a large extent borrowed from the annales of the Dominican friar, Nicholas Trivet. For example, as Mr Gairdner points out, the whole reign of Edward I. is almost exactly identical in the two. As a chronicler Risshanger is full and truthful, but his work is fragmentary towards the close, and besides some confusion has crept into the order of the narrative. The story is told with considerable spirit, and reveals high admiration for Simon de Montfort. The Willemi Risshanger Chronica et annales, forming vol. iii. of the chronica monasteriorum, has been edited for the Rolls series by H. T. Riley (1865).

**Rishi** is the title given to the inspired poets of the Vedas. See VEDA.

**Risotto** an Italian dish, consisting chiefly of rice. Onions are shreed into a frying-pan with plenty of butter, and they are fried together until the onions become very brown, and communicate their colour to the butter. The butter is then run off, and to this is added some rich broth, slightly coloured with saffron, and the whole is thickened with well-boiled rice, and served up instead of soup at the commencement of a dinner.

**Ristigouche.** See RISTIGOUCHE.

**Ristori,** Adelaida, an Italian tragedienne, was born on 26th January 1821, at Cividale in Friuli. Her parents were strolling players, and she joined the troupe at the age of fourteen she played in Francescan di Raimino, and in a few years became the leading Italian actress. In 1847 her marriage with the Marquis Del Grillo (died 1861) temporarily interrupted her dramatic career; but she soon returned to the stage. After having acted in Italy for some years with immense applause, she presented herself before a French audience in 1855, when Rachel was at the height of her fame. But Ristori won a complete triumph; and thereafter gained fresh laurels in nearly every country she visited. In the United States (in 1859 and 1875, and 1884-5), and in South America, where her magnificent tragic acting roused the greatest enthusiasm. The roles in which she especially shone were Mary Stuart (Shiller's), Elizabeth (Giacometti's), Meles and Meri (Antoinette (Lemont), Lady Godiva (Lisboa), and Antigone of Louvain (Scribe's). See her Studi e Memorie (Eng. trans. from French, 1888).

**Ritchie, Mrs RICHMOND.** See THACKERAY.

**Rittornello.** In Music, in its original sense, a short repetition, like that of an echo, or a repetition of the closing part of a song by one or more instruments. The same term is, by later usage, been applied to all symphonies played before the voices begin which prelude or introduce a song, as well as the symphonies between the members or periods of a song. The name is also given to the holding together of music in popular poetry, and consists typically of a strophe of three lamine lines, the first and third rhyming.

**Ritschl,** Albrecht, Protestant theologian, was born 25th March 1822, at Berlin, where his father was a clergyman. His university studies were carried on at Bonn, Halle, Heidelberg, and Tubingen. His name is also given to the holding together of music in popular poetry, and consists typically of a strophe of three lamine lines, the first and third rhyming.
is in fact identical with His grace. All metaphysical statements as to His absoluteness or existence through, or in, or for Himself are of no real significance. What is important is the relation of God, Ritschl attaches high importance to the conception of the church as being the community within which alone men can have reconciliation with God and freedom from the sense of guilt, and so be able to act from motives of love, and realise that human and divine fellowship of perfect love which is the kingdom of God. In this Ritschl expressly differs from Schleiermacher (in many other respects a master whom he follows closely); but, while rejecting the Protestant formula of the latter, that the relation of the individual to the church depends on his relation to Christ, he is very far removed from the position of Roman Catholicism. His doctrine of Christ attaches no value to the hypothetical distinction of persons in the Godhead or to the ecclesiastical doctrine of the two natures or the three offices, but states the divinity of Christ in its entire influence over his pupils, in relation to the church, which he founded by his life and work on earth. This work was atomic work; but the reconciliation with God and immunity from the sense of guilt which he secured for the church were obtained not by vicarious endurance of guilt, but by His perfect fulfillment, in loving deed and word, of the work of His calling, and by His perseverance in it in spite of all opposition, and by His patient endurance of all suffering even unto death. The justification possessed by the Christian as a member of Christ's community is practically shown in his freedom or dominion over the world. This dominion is exercised, in trust in God's providence, by patience, by humility amid all the vicissitudes of life, by faithfulness of the individual to his calling as being his contribution to the kingdom of God, and by Christian prayer, which is chiefly thanksgiving or humble recognition of the divine rule. Ritschl is usually classified as an 'eclectic mediating theologian'; perhaps 'intermediate' would be a better word, for his theology is uncompromisingly opposed alike by the 'rationalist' and by the 'orthodox' parties. The last formed a sort of university of the church at Leipzig, which was the most prominent among them being Kaftan, Herrmann, and Bender.

See the Life by his son Otto (2 vols. 1892–96); Stehlin, Kant, Lotze, and Ritschl (trans. 1880); Pfeiferer, Die Theologie und Christentum (1891); and works by Meikho (1894) and Pfenninger (1896).

Ritschl, Friedrich Wilhelm, classical scholar, was born at Grossvargula, near Erfurt, 6th April 1806. He studied at Leipzig and at Halle, held chairs of Philosophy at Breslau (from 1834), Bonn (from 1839), and Leipzig (from 1865), and died at Leipzig on 9th November 1876. As a trenchant critic of his great influence over his pupils, amongst whom were Curtius, Ilme, Brugmann, &c. His greatest work is an edition of Plautus (3 vols. Bonn, 1848–54; new ed. 1881–87), provided with the richest critical apparatus. This standard work was preceeded by Parerga Plautina et Terentiana (Leip. 1845). He achieved a second triumph in the department of Latin inscriptions, his collection, Praxis Latinitatis Monumenta Epigraphica (Berl. 1864), being the forerunner of the great Corpus Inscriptionum Latinarum. Ritschl's numerous critical papers and dissertations are collected in Quellenbuehnc (4 vols. 1871–79). His best work is his history of the best (2 vols. 1879–81); see also another by L. Muller (1878).

Ritsch, a learned and honest, but pedantic, acrid, and ill-mannered antiquary, was born of Westmorland yeoman family at Stockton-on-Tees, in 1792. He was bred to the law, and practised as a conveyancer in London, but was enabled by the profits of the office of Deputy High-justice of the Duke of Lancaster to give most of his time to studies. He made himself as notorious by his crazy vegetation, his whimsical spelling, and irreverence, as by the acerbity of his attacks on much bigger men than himself. Scott alone of his contemporaries kept good terms with him, but then none other had so dire a heart and genie humour. Undoubtedly Ritsch's mind was deranged, and he died in a fit of gloom, 31st September 1803. Ritsch's industry was remarkable, and all his forty books are valuable despite the blemishes in which they abound. His first important work was an abridgment of Warton's History of English Poetry (1782). Next year he assailed Johnson and Steevens for their text of Shakespeare; in 1790 he attacked Bishop Percy with asподлъ ferocity in the preface to a collection of Ancient Songs; in 1792 appeared his characteristic Curious Criticisms on Malone's Shakespeare.

Other works were A Select Collection of English Songs (3 vols. 1783); Pieces of Ancient Popular Poetry (1791); The English Anthology (3 vols. 1795–94); A Collection of Scottish Songs (2 vols. 1794); Poems, Songs, and Ballads (2 vols. 1795); Robin Hood: A Collection of all the Ancient Poems, Songs, and Ballads (2 vols. 1796); Bibliographica Poetica: A Catalogue of English Poets of the XVI–XVII. Centuries (1822); and Ancient English Christian Romances (1829). His various North Country Garlands and his Essay on Abstinence from Animal Food as a Moral Duty (1829) were less important. Joseph Halswood wrote a short account of his life (1834); his Letters were edited, with a Life, by Sir N. Harris Nicolas (2 vols. 1833).

Ritter, Heinrich, German philosopher, was born at Zerbst in Anhalt on 21st November 1791, studied theology and philosophy at Halle, Göttingen, and Berlin; was professor of Philosophy successively at Berlin (1824–33), Kiel, and Göttingen (1837–69); and died in Göttingen on 31st February 1869. His fame rests upon an extremely careful and impartial Allgemeine Geschichte der Philosophie (12 vols. 1829–53), with a continuation carrying on the work from Kant (1853); and upon Die Christliche Philosophie (2 vols. 1858–59).

Ritter, Karl, a geographer, was born August 7, 1779, at Quellinburg in Prussia, was educated at Greifswald, and studied in Halle, was in 1820 nominated professor of Geography at Berlin, became subsequently member of the Academy and Director of Studies of the Military School, and died 28th September 1859. With Ritter as the founder of general comparative geography begins a new epoch in the history of geographical science. His chief work (uncompleted) was Die Erdkunde in Verhältnisse zur Natur und Geschichte der Menschen ('Geography in its Relation to Nature and the History of Man'), 10 vols. Berlin, 1822–59. The work is divided into four parts—(1) Central Asia, Siberia, China, and India; (2) West Asia; (3) Arabia; (4) Sinai Peninsula, Palestine, and Syria. Besides this he wrote an Introduction to General Comparative Geography (1852); Europe (2 vols. 1807); and The University and Ancient Monuments in the Indo-Bactrian Royal Road, and the Colossus of Bambian (1838). His lectures were published in three volumes—History of Geography (1831), General Geography (1852), and Europe (1863) by Daniel. His name is perpetuated in two geographical publications in Berlin and Leipzig. See Life by Gage (Edin. 1867) and Kramer, Conrad, Ritter, ein Lebensbild (2d ed. Halle, 1875).

Ritual (Lat. rituare, 'book of rites'), the name of one of the service-books of the Roman Church, in which are contained the prayers and order of
ceremonial employed in the administration of certain of the sacraments (communion out of Mass, baptism, penance, marriage, extreme unction) and other matters; or a development of Tractarianism, though it is only a small part of what was described by Pusey and his associates as the Roman Ritual, especially any revival of disused vestments. Colateral causes of the movement may be said to be the great advance of aesthetic taste, and the increased cultivation of the fine arts in the service of religion; as also the extended study by the clergy of ancient church books, portions of which covered to exist between them and the offices of the English Church. With the spread of High Church principles certain changes in the mode of conducting divine service had been introduced by the clergy, which, though unpopular at first, were widely adopted, and up to a certain point had received the sanction of the law. But the restored church with low and open benches; the separated chancel; the altar-table with coverings of different colour according to the ecclesiastical seasons, and candlesticks, were applied to it; choral service, and weekly celebration of the communion were all that had hitherto been attempted. To these comparatively small alterations important additions were subsequently made, bringing the usages of the Church of England nearer those of the Roman communion, such as vestments at the celebration of the holy communion, and at certain other times—for the celebrant an alb, stoles of different colour, according to the seasons, and chasuble, and for the assisting ministers albgs with tunics; lighted candles on the altar at holy communion; a chalice, and a standing vessel; the mixing of water with wine for the communion; the use of wafer-bread; elevation of the elements either during or after consecration; and processions with crosses, banners, and vested attendants. The Public Worship Regulation Act, passed after fierce discussion in both Houses of Parliament, was expressly designed, as Mr Disraeli admitted, for the repression of ritualistic practices, and constituting a new judgeship for offences against the rubries (see ECCLESIASTICAL COURTS). By its provisions, a complaint against the use of vestments, ornaments, and rite and ceremonies, or the omission of such as are ordained in the Book of Common Prayer, in the churches or burial-grounds of the Church of England, may be presented to the bishop of the diocese by an archdeacon or churchwarden, or by three parishioners, members of the church, of full age, and a year's residence in the parish. In the event of the bishop's refusal to hear, the representa- tions of the bishop, he shall forward the case for trial by the judge, from whose decision an appeal lies to the Privy-council. Since the date of the act numerous trials have taken place, and several clergymen charged with ritualistic practices have been imprisoned (A. Pooth, 1877; Pehnais, Dale and Enraght, 1880; S. F. Green, 1882; J. C. Cox, 1887). See MACKONONIE, and ENGLAND (CHURCH OF). In 1889-90 proceedings were taken in the Archbishop of Canterbury's court against L. To. The decision was given in November 1890, and related to nine heads: (1) The mixing of the cup during the service is to be discontinued; (2) but the use of a cup already mixed is not an ecclesiastical offence; (3) the court disapproved the charge as to abjuration after service, holding that all the bishop had done was the reverent consumption of what remained of the consecrated elements; (4) as to the eastward position, the court decided that there is liberty as to using the north end of the altar or the north end of the west side; (5) the breaking of the bread must be performed so as to consist of no more than 16 pieces; (6) the singing of the antient 'O Lamb of God' is not prohibited; (7) candles, which are kept lighted throughout the service are not an offence; (8) the sign of the cross must be discontinued both in absolution and benediction; the use of the relics ALFAR, CHASUBLE, LIGHTS, VESTMENTS, &c.; ENGLAND (CHURCH OF), and PRAYER-BOOK; Lee's Diameter Anglicanum (1865); and the Priest's Prayer-book, with a brief Polihtical (6th ed. 1884).

Rivaro, ANTOINE, French writer, was born at Bagneux in Languedoc, 26th June 1733. Though the son of an innkeeper, when he appeared in Paris in 1750 he had dubious claim to rank, and soon worked his way by his wit into the best society of the time. Already he had written his treatise, Sur l'Universality de la Langue Francaise (1784), and paraphrased rather than translated the Inferno, when in 1788 he set all Paris laughing at the sarcasms in his Petit Almanach de nos grands Hommes pour 1788. At the Revolution he took his place in the royalist ranks, and saved his head by emigrating in June 1792. Supported by royalist pensions, the 'Tacitus of the Revolution,' as Burke styled him in 1793, employed himself fitfully in writing pamphlets and weaving dreams of books to be written, in Brussels, London, Hamburgh, and Berlin. He had married an English wife, but she quarrelled with him, and not without reason. Rivarol died at Berlin, 13th April 1801. His works were collected by Chénédolle and Fayolle (5 vols. 1805), but their terse epigrammatic quality shows better by compression in the Esprit de Rival (2 vols. 1808) and the Oeuvres Choises, edited by Lesure (1822; new ed. 1880). See also Rivarol, Antoine, French pendant la Révolution et l'Emigration (1883).

Rivas, a decayed town of Nicaragua (q.v.), 6 miles from Lake Nicaragua. Pop. 8000. The fertile department of Rivas, between the lake and the Pacific Ocean, has an area of 1080 sq. m. and a pop. of some 25,000.

Rivaulx Abbey. See RIEVALUX.

Rive-de-Gier, a town of France (dept. Loire), stands on the Gier, in the middle of the best coal-field in France, 13 miles N.E. of St Etienne by rail. It was formerly a stronghold, surrounded by high walls, and defended by a castle. In 1815 it had less than 4000 inhabitants; in 1886, 13,728. Around the town there are about fifty coal-mines in operation, and in it and close to it several silk-mills.
glass-works, factories for steam-engines and other machinery, and iron and steel factories.

River. Water falling on the land in the form of rain, or resulting from melting snow, or rising to the surface from underground, collects on the surface of the land to a lower level. Where two slopes of land dip together the surface drainage collects to form a stream, and when evaporation is not very rapid several such streams ultimately unite and the volume of water they carry flows to the sea or to a salt lake. Small streams are termed runnels and rivulets, rills, brooks, becks, or burns; large streams are termed rivers, but the word has no precise reference to the magnitude of the stream to which it is applied. Dr Johnson gives as definitions: 'Brook, a running water less than a river;' and 'River, a land current of water bigger than a brook,' and this fairly illustrates the use of the words as popularly applied.

The beginning of a stream,—whether brook or river,—is called its source, and may be a spring issuing from underground, a lake or marsh in which rainfall accumulates, melting snow, or simply the gathering trickles from falling rain. The path of a stream is its course, and is the line of lowest level from the source to the end, which if occurring in a lake or the sea is termed its mouth. The connected streams which unite in one river form a river-system. The series of convergent slopes which drain the land on which it drains—forms its basin or catchment area, and the name watershed is also sometimes erroneously applied to it. The names watershed, water-parting, and divide are used to designate the boundary line separating adjacent basins. A watershed is the meeting-place of the highest part of divergent slopes, and from the characteristic form of continents the main watershed or a continent is almost always the crest of a range of mountains. In many cases, however, the diverging slopes meet in a low plain the summit of which may be occupied by a great marsh whence rivers creep away in opposite directions. The basins of all the rivers draining into the same ocean are called collectively the drainage area of that ocean. The main river to which the others gather or are tributary is given its name in the river-system. It is often difficult to decide which of several converging streams is entitled to carry the name of the main river to its source. Some geographers give this distinction to the longest, others to that with the highest sources, and others to the one which first enters a large river. This divergence of opinion is increased when the name of a river leaving a large lake is given to one of several nearly equal streams which enter it. Hence it is that different computers disagree as to the length of rivers. The course of a typical river has been divided into three parts, although these are not represented in all cases. The torrential or mountain track is the steepest, its gradient usually exceeding 50 feet in a mile, and the velocity of its current being very great. The valley or middle track has a gradient which is rarely greater than 10 feet and often less than 2 feet in a mile. The surface track nearest the mouth of a river has a gradient of only a few inches in a mile. Rivers such as the Amazon, Mississippi, Ganges, Volga, and the long rivers of Siberia, in which the plain track is of very great length, are the most valuable for navigation, the liveliness and navigability being a gradient of about 1 foot in a mile.

The velocity of a river is proportional to the slope of the bed, but it also bears a relation to the depth of the channel and the volume of water flowing in it. On account of friction on the bottom and sides of the channel retarding the stream, the water flows fastest on the surface and in the middle. The carrying power of a river for suspended solid particles and for stones and gravel pushed along the bed depends on the velocity alone. The following table shows how rapidly the carrying power falls off as the velocity diminishes.

<table>
<thead>
<tr>
<th>Velocity (miles per hour)</th>
<th>Carrying Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.170</td>
<td>0</td>
</tr>
<tr>
<td>0.340</td>
<td>5</td>
</tr>
<tr>
<td>0.450</td>
<td>10</td>
</tr>
<tr>
<td>0.620</td>
<td>20</td>
</tr>
<tr>
<td>1.260</td>
<td>100</td>
</tr>
</tbody>
</table>

That the velocity of a river increases downstream, is shown by the fact that lakes or ponds, whether in the country or in the city, are generally found near the source of the stream. The height of the water above spring tide is less at the mouth than at the source; and the water is slowest at the headwaters, where it is fresh, and swiftest at the mouth, where it is salt. The mouth of the river is the delta, formed by the water depositing at its approach the material worn by it; the deposit is largest and of most value where the river enters the sea from the north, and is least and of least value where it enters the sea from the south. The mouth of a river is also made shallower and wider by the deposit of material washed in from the adjacent uplands and islands. Rivers are the great agents of erosion; the most effective agents in the mountainous regions being the revolving landslides, in the submarine regions, the submarine canals, in the river regions, the subterranean canals, carved in the rock. When a river approaches a level plain it forms a lake, and when the level plain is a desert it forms a salt lake.
margin. These are increased in height by each successive flood, and, the river-bed being simultaneously slilted up, broad muddy rivers like the Mississippi, Po, and Hoang-ho come in time to flow along the top of a gently sloping natural embankment, the sides of which are defended by great banks of deposit (see Delta), or by bars of gravel or sand. In some cases, however, such as the River Plate, the Thames, and Tay, the mixture of river and sea water is gradual, and the sandbanks are spread over a very large area, but not built up into a delta at any one place. Professor Osborne Reynolds has shown, by a remarkable series of experiments, that the form of the sand-banks is due to the outline of the coasts of the estuary and to the tides. In a few instances, such as the Po, rivers enter deep channels of the sea which neither banks nor bars are formed. The Congo sweeps directly into the ocean, throwing down great banks of deposit along the continental slope to right and left, but leaving a deep caisson-like gully for the bed of the stream itself; a similar curved gully occurs where the Rhone enters the Lake of Geneva.

The ultimate source of all rivers is the condensation of water-vapour from the atmosphere in the form of rain, snow, and even dew. If the land were composed of impermeable rocks all the rain-water would not be lost by evaporation, would rise off directly over the surface, and rivers would only flow during and immediately after showers. A large part of the rainfall, however, soaks into the soil, which retains it as in a sponge, especially if the land be marshy, and allows it to flow off gradually as superficial springs. Some percolates deeply into the rocks, ultimately emerging as deep-seated springs at a great distance. The indirect and permanent supply of water to rivers by springs and by the outflow of lakes is incalculable, and part of the surface water left upon the land serves to maintain the volume of the river at a certain minimum during the dry seasons. When a river flows toward a region of great evaporation and small rainfall, such as exists in the interior of each of the great continents, evaporation removes more water from the river than it receives from the rains, and the stream may fall to fill the hollow it enters, and therefore cannot overflow into the sea. This is the case with the Oxus entering the Aral Sea, and the Volga entering the Caspian. It may be that evaporation is so far in excess of contributions from distant rainfall or snow-melting that the river dries up as it flows, and its last remnant is absorbed in the desert sand. This is the fate of the Murgab, the Heri-rud, the Zerashfan, and many other rivers of central Asia.

The largest in the world are those in which the periodical or occasional increments of direct inflow increase the volume so much as to cause a great rise of level or even extensive inundations. The annual inundations of the Nile are due to the monsoon rainfall on the great mountains of Abyssinia and the Western Ghats. The flow of the Niger to fifteen times the amount of the river at its lowest. The Orinoco is another instance of seasonal rains producing tremendous inundations, over 40,000 square miles of the Llanos being said to be laid under water by the seasonal overflow. The Nile in Egypt is an instance of a river which is always more or less in flood as the various tributaries attain their greatest height at different seasons. In June, when the highest level occurs in the main river, 20 or 30 miles of forest on each side of its banks are laid under water for hundreds of miles. The Ganges overflows its banks in summer when the monsoon rainfall is reinforced by the melting of snow on the Himalayas. Where the seasons of rainfall and snow are widely separated, as in the Mississippi, the Tigris, and Euphrates, there are two regular floods in the year. The danger of flooded rivers arises from the suddenness with which the water rises and overflows its banks. Frightful devastation follows the bursting of dammed-up reservoirs, as in the Volga, when some lakes in mountain-valleys (see Lake). The great rivers of Siberia remain frozen at their mouths long after the ice and snow have been melted in the interior, and broad strips on their margins are needlessly laid under water by the natural outflow being stopped. The most serious floods in the Danube and Theiss have resulted from the construction of the channel at the Iron Gates, which prevents the flood water from passing away as rapidly as it comes down; the current of the rivers as a result of the water accumulating, the widening of the channel has been repeatedly attempted as a remedy by increasing the outlet; and an elaborate system for regulating the river here, to be completed in 1895, was begun in 1806. In other cases, such as the tributaries of the Loire, and the south branch of the Po, the natural outfall of the water is prevented, the melting snows swell the torrential track, and, on account of the abrupt change of level and the flatness of the plain, the lower part of the rivers cannot carry away the immense volume of water rapidly enough, and floods result. In some instances torridal rivers have been successfully diverted into lakes, which regulate their outflow, preventing either dangerously high or extremely low water. Great rivers which have embanked their course above the level of the plain are the most dangerous of all when flooded. The damage caused by the bursting of the levees on the lower Mississippi necessitates a great expenditure in strengthening the embankments, and the most disastrous inundations recorded in history have followed the bursting of the banks of the Hoang-ho (q.v.) and its tributaries on account of course.

River-water is spoken of as fresh, but it always contains a certain amount of solid matter in solution, varying from two grains in the gallon or less in rivers draining hard crystalline rocks to fifty grains in the gallon or more in limestone districts. The nature of the solid deposits of the river depends, according to the geological character of the country traversed, but all samples of river-water differ from sea-water in containing a much smaller proportion of chlorides, and a very much larger proportion of carbonates and of silica.

The temperature of rivers as a rule follows that of the air, but is subject to variations on account of the effect of rain. During sudden floods in summer the temperature of the water may fall many degrees in a few hours as the meltwater snow and ice from the lofty mountains is carried toward the sea.

The great rivers of Europe and Asia, such as the Rhine, Danube, Volga, Indus, Ganges, Brahmaputra, Yang-tse-kiang, afford access to the sea to enormous populations. The Amazon, with its plain track extending over about one hundred and thirty degrees of latitude, is its station is a river which always moves less like a river than a fresh inland sea; but the Mississippi and St Lawrence, although less extensive, are of greater value for carrying sea traffic to inland places. In their torrential and rapids valley the rivers are chiefly for transporting timber and driving machinery. It is interesting to note that in Switzerland, Norway, and Sweden, where there is no coal, there exist exceptional facilities for the use of water-power on
account of numerous mountain-torrents. In hot countries rivers are of the utmost service in irrigating agricultural land; the Zerafshan and Manghah are entirely consumed in that service, and since the completion in 1800 of the aqueduct on the Nile, no water escapes to the Mediterranean in the low Nile months except along irrigation canals.

The Largest River-Systems.

<table>
<thead>
<tr>
<th>River</th>
<th>Area of Basin, sq. m.</th>
<th>Length, miles</th>
<th>Annual Mean Flow of Basin, Feet.</th>
<th>cu. miles</th>
<th>Annual Mean Flow</th>
<th>cu. miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amazon</td>
<td>2,200,000</td>
<td>400</td>
<td>3834</td>
<td>528</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congo</td>
<td>1,500,000</td>
<td>400</td>
<td>3204</td>
<td>324</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nile</td>
<td>2,500,000</td>
<td>370</td>
<td>992</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mississippi</td>
<td>1,200,000</td>
<td>410</td>
<td>673</td>
<td>150</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nile</td>
<td>1,000,000</td>
<td>400</td>
<td>900</td>
<td>80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ob.</td>
<td>1,190,000</td>
<td>400</td>
<td>1050</td>
<td>140</td>
<td></td>
<td></td>
</tr>
<tr>
<td>La Plata</td>
<td>900,000</td>
<td>230</td>
<td>905</td>
<td>190</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lena</td>
<td>500,000</td>
<td>300</td>
<td>600</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yenisei</td>
<td>1,200,000</td>
<td>300</td>
<td>600</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yang-tse-kiang</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mackenzie</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volga</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ganges and Brahmaputra</td>
<td>4,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zambesi</td>
<td>1,500,000</td>
<td>140</td>
<td>789</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>St. Lawrence</td>
<td>2,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winnipeg-Nelson</td>
<td>800,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yangtze</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Orinoco</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon</td>
<td>1,200,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hoang-ho</td>
<td>2,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indus</td>
<td>2,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Danube</td>
<td>2,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Murray</td>
<td>2,000,000</td>
<td>230</td>
<td>152</td>
<td>47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The statistics of this table, in which account is taken of rainfall and discharge, are taken from Dr John Murray's paper in Scot. Geog. Mag. iii. (1887) p. 65. The lengths in all cases and the areas of basins in those for which no rainfall statistics are available are according to the statistical tables in Justus Perthes' Taschen-Atlas.

Rivers in Law.—A distinction is made between public navigable rivers and private fresh-water rivers. Where the tide ebbs and flows, the ownership of the bed is in the crown for behalf of the public, and, consequently, the crown is entitled to deepen the channel or perform any other operation on the aveus that may improve the navigation. The banks, however, beyond the foreshore are the private property of the riparian owner. It is settled in England—and an opinion of the same effect has been delivered in Scotland—that the public have no common law-right to set up even a towing-path along the bank of a navigable river; but, of course, such a privilege of roadway along a public waterway may be established by prescriptive possession. And if the ordinary level of the tide on all rivers and streams are public for navigation, although either by immemorial use or by act of parliament, many have become subject to public rights of navigation. In the case of private rivers the aveus belongs to the proprietor through whose ground the river runs; or, if the river separates the lands of two owners, each is owner of the soil of the bed to the middle of the stream. The waters of a stream passing through or between the lands of different proprietors may be subject to two kinds of rights, natural and acquired. Natural or proprietary rights are those possessed by every riparian proprietor; they consist principally of a right to a reasonable use of the water, while it is flowing past his land, and a right to have the water flow in its accustomed manner, without sensible disturbance or diminution by the superior or interior riparian proprietor. Thus, although such proprietor may employ the water while it is within his own grounds, he must allow it to pass onwards to the inferior proprietors in its original channel, and cannot alter its level, either where it enters or leaves his property. The riparian proprietor, either in a public or private river, may protect his side of the stream by embankments; but such embankment must be constructed only for defence, and not in such a manner as to throw the force of the current upon the opposite bank. Acquired rights, on the other hand, are those easements which a riparian proprietor to interfere with a natural stream of water to an extent not justified by his natural or proprietary rights—by diminishing or obstructing the flow of water, by polluting it, &c. Such acquired rights in respect of water may exist in the inhabitants of a district by virtue of immemorial custom, and, both as to kind and extent, are regulated wholly by prescription.

The pollution of rivers has of late years, in consequence of the extension of manufactures, caused serious concern. No person has a right to poison or pollute a stream, and if he do so any of the persons whose lands abut on the stream lower down may bring an action to recover damages. While, however, this right to object to an existing nuisance may be excluded by acquiescence or by prescription, it is so excluded only to the extent of the actual use or possession, and any material increase of the pollution or annoyance may be challenged and interdicted by a judicial remedy. At common law, indeed, in every question of river-pollution, the real question of fact is whether there has been any material increase of pollution beyond that which is natural to the particular stream, or beyond that which has existed there for the prescriptive period. The rights of rivers are not to be fitted for submission to a jury, and are generally disposed of in that way. The whole circumstances must be considered; for example, the size and character of the stream, the use to which it can be and is applied, the nature and importance of the use claimed and exercised by one party, as well as the inconvenience or injury to the other party. In England, where the pollution of a stream amounts to a public nuisance, the party causing it may be prosecuted by indictment, or proceeded against by information at the suit of the Attorney-general. All the chief modern sanitary acts have provisions regarding the pollution of water; but most of them are local or deal with the pollution of water used for special purposes. In 1868 a Royal Commission was appointed to consider the question of river-pollution, and its recommendations were followed in the laws of 1871, 1872, and 1876. See Duke's Pollution Acts. (29 & 30 Vict. chap. 75), which is applicable to both Scotland and England. See Higgins, On the Obstruction and Pollution of Water-courses (1877).—For fishing rights, see SALMON, and TROUT.

In the United States the common law of England was adopted, and although all the states it is expressly declared that the common law is inapplicable. Mining rights have been specially determined in some districts; and the laws as to irrigation rights have been elaborately defined in Colorado and elsewhere.

Rivera, a department in the north-east of Uruguay, separated by a mountain-chain from Brazil. Area, 3790 sq. m. ; pop. 17,087.

Riverina, a name given to the extensive grazing districts in the western part of New South Wales, Australasia.

Rivers, Richard Woodville, or Widvile, Earl, was esquire to Henry V., and during his son's reign was made Governor of the Tower (1424) and knighted (1425). He fought in France in 1428, and in 1440 against the Lancastrians. He took to wife Jaquetta of Luxembourg, widow of the Duke of Bedford, and it was their daughter Elizabeth whom Edward IV. married. This led Sir Richard Woodville to change over to the Yorkist side, and his royal father-in-law made him successively Constable of England, Baron Rivers (1448), and Earl Rivers (1465). But the favour shown to the Rivers family offended
ROADS

Giarrus

both

1881. This

it

far

Lord

wild

nail

and

liis

Genoa

15

succession

After

Ponente,

1891

include

probably

1878,

seized

enmity

through

for

differ

gravings.

called

in

steam

produce

plates

head

metal

and

provenc

Antibes.

from

occasional

this

work

for

years.

1483.

son

of

Huguenot

1866

1840,

work

a

plan

13

by

a

and

of

1895).

an

invaluable

the

refugees.

by

blackmail

for

seized

enmity

through

for

differ

gravings.

called

in

steam

produce

plates

head

metal

and

provenc

Antibes.

from

occasional

this

work

for

years.

1483.

son

of

Huguenot

1866

1840,

work

a

plan

13

by

a

and

of

1895).

an

invaluable

the

refugees.

by

blackmail

for

seized

enmity

through

for

differ

gravings.

called

in

steam

produce

plates

head

metal

and

provenc

Antibes.

from

occasional

this

work

for

years.

1483.

son

of

Huguenot

1866

1840,

work

a

plan

13

by

a

and

of

1895).

an

invaluable

the

refugees.

by

blackmail

for

seized

enmity

through

for

differ

gravings.

called

in

steam

produce

plates

head

metal

and

provenc

Antibes.

from

occasional

this

work

for

years.

1483.

son

of

Huguenot

1866

1840,

work

a

plan

13

by

a

and

of

1895).

an

invaluable

the

refugees.

by

blackmail

for

seized

enmity

through

for

differ

gravings.

called

in

steam

produce

plates

head

metal

and

provenc

Antibes.

from

occasional

this

work

for

years.

1483.

son

of

Huguenot

1866

1840,

work

a

plan

13

by

a

and

of

1895).

an

invaluable

the

refugees.

by

blackmail

for

seized
of English History) gives them as follows: 'The Watling Street represents the old zigzag route from Kent to Chester and York, and northwards in two branches to Carlisle and the neighbourhood of Newcastle, the Fosse Way ran diagonally through Bath to Lincoln. The Ermin Street led direct from London to Lincoln, with a branch to Doncaster and York; and the obscure Icknield Street curved inland from Norwich to Dunstable, and was carried eventually to the coast at Southampton.' Watling Street and Icknield or Icknield Street have separate articles in this work.

Through a large part of the land in Great Britain gradually fell into decay, and the attempts that were now and then made to repair them were insufficient to prevent England falling into a worse state with respect to its highways than most other European countries. In 1285 one of the earliest laws on the subject of roads was passed. It directed that all trees and shrubs be cut down to the distance of 200 feet on either side of roads between market-towns, to prevent the concealment of robbers in them. The first toll for the repair of roads was levied by the authority of Edward III. in 1340, on roads which now form part of the streets of London. In 1555 an act was passed requiring each parish to elect two surveyors of highways to keep them in repair by compulsory labour; at a later period, in place of the compulsory labour, the 'statute labour-tax' was substituted.

But long after this the roads even in the neighbourhood of London were wretchedly bad, and in the other parts of the country they were still worse. For the most part, indeed, they were mere horse-tracks; the chief advantage in following them being that they led along the higher grounds, and so being above water were usually impassable in winter, being narrow, and in many places so deep and miry as to be like ditches rather than roads. So late as 1736 the roads in the neighbourhood of London were so bad that in wet weather a carriage could not be driven from Kensington to St James's Palace in less than two hours, and sometimes stuck in the mud altogether. Much curious information on the state of the roads and means of conveyance in England during the long period which elapsed from the decay of the Roman roads to the middle of the 18th century, will be found in Mr. Ickham's Lines of Engineers. The Highlands of Scotland were opened up by the roads made by General Wade about 1725.

In laying out a new line of road the skill and ingenuity of the engineer are taxed to make the gradients easy, with as little expense as possible in excavating and embanking, and to do so without deviating much from the direct course between the fixed points through which the road must pass. To succeed well in this an accurate survey of the tract, including the relative levels of its different parts, and the nature of the strata, is a necessary preliminary. The level line of a road often involves the construction of extensive bridges, viaducts, and the like, which require the greatest engineering skill.

The importance of easy gradients or inclinations in roads is well understood in a general way; but it is of the greatest importance to state that, while, for example, the traction force requisite to draw a wagon weighing 6 tons along a level macadamised road is 264 lb., on a road of the same kind with an ascent of 1 in 50 the traction force is just double, or 533 lb., the speed of the wagon being 3 miles an hour. Compare, however, a stagecoach travelling on the level at the rate of 6 miles an hour, and weighing 3 tons, requires a traction force of 302 lb.; but the resistance on a hilly road is less unfavourable to the coach than to the wagon, because with an incline of 1 in 70 the forces necessary to draw the two vehicles are about equal, and the force is proportionally greater for the wagon as the incline increases. Experience seems to show that for a macadamised road the maximum slope should be 1 in 40, although a horse with a moderate load can easily trot over a gradient of 1 in 33. On the other hand, as it is not desirable for drainage to have a road perfectly level, the best minimum slope, in a longitudinal direction, has been variously given at from 1 in 80 to 1 in 125. The resistance to moving vehicles is less on paved than on 'metalled' roads; hence the maximum slope of a metalled road should be less than that of the latter, from the greater tendency of a cart or coach to slide down the smoother surface.

What is the best transverse form for a road has been a much-debated question among engineers. It should be higher in the middle than at the sides; but some have thought it should be much higher than others. As a road can be better kept clear of water by a slight inclination in the direction of its length than by any form which can be given to its cross section, it has been found preferable that it should be as nearly flat as possible, because every part of its breadth will then be equally available for traffic; whereas it is almost necessary to keep on the centre of a highly inclined road, and consequently wear deep furrows there, by confining the wheels and horses to pretty much the same track. The figure shows a transverse section of a road in the form of a segment of a circle—the most approved form—with only a slight rise in the centre. The slope from the side to the middle should not exceed 1 in 36.

As respects the construction of the road itself, the first point to consider is the foundation or subroad. The majority of roads have no artificial foundation. In such cases the surface on which the road material is to be laid is generally made as solid as possible by means of efficient drainage, and by rolling and beating wherever there are embankments formed. It is the question whether or not a road should have a foundation of rough pavement below the broken stone covering which is the essential point of difference between the two great rival systems of Telford and Macadam. Telford, who began to construct roads in 1803, considered it of great importance that there should be such a foundation. He made it of stones varying in depth from 9 inches at the centre to 3 inches at the sides of the road, these being set with their broadest edge downwards, and no stone being more than 4 inches broad upon the upper edge; upon these were placed a coating of broken stones not exceeding 6 inches in thickness. The Glasgow and Carlisle and the Holyhead roads are constructed on the same lines as the road made of stones laid one upon the other on the road in telford's plan. Macadam (q.v.) preferred a yielding and soft foundation to one which was rigid and unyielding, so that even on boggy ground, if it were but firm enough to allow of a man walking over it, he considered an artificial laying quite unnecessary. His roads were formed entirely of angular pieces of stone of such a size as to pass freely through a ring 24 inches in diameter. This plan, first put into practice about 1816, has now few advocates than Telford's, or than

Cross Section of a Road:
- A, foundation of rough pavement or concrete; B, broken stones.

The diagram shows the gradient and alignment of the road, as well as the typical cross section. The road is designed to minimize resistance to traffic flow while ensuring durability and proper drainage.
the one subsequently proposed by Mr Thomas Hughes, where a concrete of gravel and lime is employed for the foundation of the road. But experience has shown that, except in the case of streets with very heavy traffic, Macadam's plan of employing angular pieces of stone is superior to even other covering for roads, whether they have an artificial foundation or not. So popular at one time was the system of macadamisation that expensively paved streets were torn up to be re-formed on the new plan. The advantage of angular pieces of stone is that they dovetail into one another, and do not break up and shift when their surface is worn.
but an act of parliament can legalise such uses of a public road as
Subject to the rights which he has conferred on the public, the owner retains his right of property in the land. If the land on both sides of a highway belongs to the same owner, it is to be presumed that his rights extend over and under the road, if the land on one side belongs to A and on the other side to B, each is presumed to be owner up to the middle line of the way. If, for example, a mine should be opened in the neighbourhood of the road, the adjoining owner or owners would have the right to mine under it, so long as sufficient support is given to the surface of the land. If a water or water company without authority of parliament takes up a road to lay its pipes, this is not only a nuisance but a trespass, for which damages may be recovered by the owner of the land. It has been held that a person loitering on a highway for the purpose of poaching may be indicted for trespassing on the land of the adjoining owner.

The repair of a carriage-way involves a regular outlay, and there are some cases in which this burden is imposed upon the owner of the land, *ratione tenure, as a part of the service by which he holds that tenement*. But there is a rule of common law that the inhabitants of a parish must repair the highways within the same; they are liable to indictment if they fail to perform this duty, and no agreement can enter into will relieve them of their liability. Many townships, &c., which are not separate poor-law parishes are separate highway parishes by ancient custom. The management of highways separately maintained by the parish was regulated by an act passed in 1835, and amending acts; a parish surveyor was elected by the ratepayers; in parishes over 5000 population a board might be elected. By an act of 1862 many parishes were grouped in districts. The highway board of a district consisted of waylearders elected for the parishes therein, and of the acting justices who reside in the district. Under the Public Health Act an urban sanitary authority was made the highway authority within its district. Many of the main roads throughout England were constructed or improved under Turnpike trusts, constituted by acts of parliament. Turnpike trusts and highway boards have alike been superseded by the provisions of the Local Government Act of 1888. The arrangement of the main roads of a county now rests with the county council, and the burden of their maintenance is a county charge. The rural district councils are the highway authorities for highways other than main roads, and have the powers of the surveyors of highways. In boroughs the powers of the county council are exercised by the corporation. The parish councils take charge of the repair of foot-paths. Tolls had been generally abolished before these sweeping changes in road management; see Toll. Legislation as to road-engines and motor-cars is Act 1896.

In the law of Scotland a highway is said to be *inter regaliam* ; but it seems that the presumption is that the land over which a road passes belongs to the adjoining owner or owners. Public rights of way are acquired by actual use for the prescriptive period of 21 years. There are formerly two classes of roads—statute-labour and turnpike; by the Roads and Bridges Act, 1878, the management of all roads was vested in county road trustees; by the Local Government Act of 1889 the powers of the road trustees were transferred to the county councils. When they are managed by the town council or the commissioners of police.

For an outline of the English law, see Wright and Hobhouse, Local Government in England; for the Scotch law, Goudy and Smith, Local Government.

---

**Roanne**. a town of France (dept. Loire), 52 miles E. N.W. of Lyons, stands on the right bank of the Loire, which becomes navigable here, and is crossed by a stone bridge (1820). The principal church is St. Stephen’s (15th to 17th century). Roanne has besides an old castle with antiquarian collections, a new hotelling-de-ville with public museums, and some governmental trade, especially in Lyons manufactures, in iron and coal, and oriental wares. Pop. (1872) 18,615; (1886) 30,060; (1891) 29,744.

**Roanoke**. a river of Virginia and North Carolina, formed by the union, a mile above Clarksville, Virginia, of the Dan and Staunton rivers, which rise in the Alleghenies, flows south-east through the north-eastern portion of North Carolina, and empties into Albemarle Sound. It is navigable for steamboats to Weldon (130 miles); its length is 290 miles.

**Roanoke**. a city of Virginia, on the Roanoke River, 238 miles by rail W. of Norfolk, at the junction of the Shenandoah Valley and the Norfolk and Western Railway. In 1880 it was a small, bustling city, with a church house, opera-house, hotels, churches, gas, coal and electric lights, large machine-shops, steel and iron works, a rolling mill, tobacco, spoke, and canning factories, bottle-works, &c. Pop. (1880) 609; (1900) 21,493.

**Roaring**, popularly known as a disease, is only a symptom of disease in horses. It consists in a more or less loud unnatural sound emitted during the act of inspiration. As a rule it is first manifested by an animal making a slight noise, but this slowly increases in loudness and intensity, and in many cases the animal becomes useless whilst still comparatively young. Whistling is a modification of roaring, and is due to similar causes. The disease is found to be due, in the great majority of cases, to a wasting, atrophy, and fatty degeneration of the muscles of the larynx, but more particularly of those of the left side. This is partly at least explained by the fact that the nerve supplying the motor power to the left side is given off deep within the chest, winding round the posterior aorta, whereas that on the right is given off opposite the first rib, just at the entrance into the chest, and that the left nerve is more apt to be implicated in diseases of the chest than the right. Still the nervous theory is not quite satisfactory, as the same anatomical arrangement is found in other animals, yet roaring from muscular atrophy is not known among them, and many ‘roarers’ whose history has been known from birth have never suffered from chest affections, whilst others severely affected with chest disease have not become roarers. Again, mares and ponies are not nearly so prone to become roarers as males and larger horses.

The development of roaring is often due to catarrh, strangles, or some other disease affecting the respiratory organs, but it is not known that these diseases are not sufficient of themselves to cause it, provided there be no hereditary taint, this hereditary taint alone being sufficient in many instances to induce roaring without the advent of another disease. There is no cure for it, all attempts to stop it from this disease being an unproved abortive. In 1887 an operation for the cure of roaring was reintroduced by Dr. Fleming, then principal veterinary surgeon to Her Majesty’s forces. Similar operations had been performed by Günther, in Hanover, so far back as 1834. It consists in leaving a long incision in the skin of the animal being under chloroform, and removing the arytenoid cartilage and vocal chord of the paralysed side. Some horses were slightly benefited, but many became worse than before the
operation, and had to be destroyed. This proved a great disappointment to the veterinary profession, as hopes had been held out that at last a cure for roaring could be found.

Roaring is now included by the Royal Agricultural Society of England among the hereditary unsoundnesses, and their veterinary officers are instructed to disqualify all horses exhibited at the great national show that give any signs of this grave hereditary disease. See works by George Fleming (1889) and T. J. Cadiot (trans. 1898).

Roaring Forties, a sailor's term for a region of the great Southern Ocean lying south of 40° S. lat. (especially south of 45°), where the prevailing winds are strong WNW. and NW. winds, often followed by a hailstorm. It is acting for robbers that the outward voyage to Australia is made by the Cape, and the homeward voyage by Cape Horn. The same name is sometimes given by analogy to a belt of the North Atlantic about 40°–50° N.

Robben Island (Dutch, 'seal island'), an islet at the entrance of Table Bay, 10 miles NW. of Cape Town, which was a leper colony, then a lunatic asylum from which long-term patients were removed. The management of which latter institution caused some discussion in 1889 and 1890.

Robber Connell. See EUTYCIES.

Robbery is the taking and carrying away, either with violence or with threats of injury, of a thing which is on the body or in the immediate possession from which its owner is unable to prevent it, or if taken under such circumstances that in the absence of violence or threats the act committed would be a theft. In order to constitute the crime, the robber must actually obtain possession of the goods. Further, it is well established that no sudden snatching of property by unawares from a person insufficient to constitute robbery, unless some injury be done to the person, or there be a previous struggle for the possession of the property, or some force used to obtain it. By statutory law in England and Ireland (24 and 25 Vict. chap. 96) the punishment for robbery is imprisonment or penal servitude, varying according to the nature of the violence or threats used. By the Criminal Procedure (Scotland) Act, 1857 (50 and 51 Vict. chap. 38), the jurisdiction of sheriffs has been extended to robbery, and the sheriffs are cognizable only by the Court of Justiciary. It is, however, to be noted that this extension of jurisdiction does not render bailable crimes, such as robbery, which were not formerly bailable. By the above-mentioned statute it is now competent, under an indictment for robbery, to vest the robbery, to recover, or attempt to rob. An act of robbery committed upon the high seas constitutes the offence of piracy at common law, and each state is entitled to visit the crime with the penalties which its own laws may determine. In England cases of piracy are now tried at the Central Criminal Court and at the assizes.

Robbia, Luca della: sculptor and modeller of figures in relief, was born at Florence in 1399 or 1400, worked all his life there, and died there on 20th February 1482. He designed and executed between 1429 and 1434 ten panels of Archangels and Dancing Boys for the cathedral, which Professor J. H. Middleton calls one of the greatest pieces of sculptured work in the 15th century. Another great work by him was a bronze door, with ten panels of figures in relief, for the sacristy of the cathedral, made from the marble he sculptured. In 1437–58, the tomb of Federighi, Bishop of Fiesole (now in the church of San Francesco outside the city). The frame that surrounds this monument is made of exquisitely painted majolica tiles. It is closely associated with the production of figures in glazed or enamelled terra-cotta, made by a process which, though he did not invent it, he yet perfected greatly. Amongst the works he executed by this process are numerous medallions, made in white enamel on a grey ground. His principal pupil was his nephew ANDREA (1435–1523), who worked chiefly at the production of enamelled reliefs, retabls, and medallions, these last for the most part reproductions of the Madonna and Child. Nearly all his works were of religious subjects; thus a panel of St Euphemia ((q.v.) is by him). His son Giovanni (1469–1530) continued the activity of the family in this style of work; his best productions are the frieze, representing the Seven Works of Mercy, outside a hospital at Pistoia, and a fountain in the sacristy of St Mary Novella in Florence.

See Cavallucci and Molinari, Les Della Robbia, leur Vie et leur Oeuvre (1884); Leader Scott, Luca Della Robbia (in 'The Great Artists' series, 1885—10 be used with caution); and M. Raymond, Les Della Robbia (Florence, 1887).

Robert I. (of Scotland). See Bruce.

Robert II., king of Scotland 1371–90, was born 20 March 1316, two years after the battle of Bannockburn. His father was Walter Stewart (q.v.), his mother Marjory, only daughter of Robert the Bruce; and both parents he lost in infancy. Throughout the disastrous reign of his uncle, Sir David II., he suffered much of the bitterest. The patriotic nobles of Scotland, twice acting as regent during his exile and captivity, and fighting at Halidon Hill (1333) and Neville's Cross (1346). On David's death (22d February 1371) he obtained the crown, and became the founder of the Stewart dynasty, in whose interest the last of the Wemyss works of the law of succession self by the Council of Estates at Ayr in 1315. 'A man not valiant,' Froissart says of him, 'with red blear eyes, who would rather lie still than ride;' and partly from disposition, partly from the infirmities of age, Robert proved a peaceable, if not exactly a pusillanimous, ruler. Such wars as were waged with England were not only conducted, but organised, by his powerful and intractable barons, particularly the Earls of Douglas, Mar, March, and Moray, who shaped the policy of the country very much according to their pleasure. The misery inflicted on both sides of the Border by the raids of these warlike chiefs, and the reprisals of the English wardens—the Peresies and others—were frightful; famine and pestilence became chronic, but the most celebrated incidents of Robert's reign were the invasion of Scotland by a foreign military and naval force under the command of the Duke of Lancaster ('old John of Gaunt, time-honoured Lancaster') in 1384, and again by King Richard II. himself in 1385, which wasted the land as far as Edinburgh and Fife, and the grand retabulary expedition of the English in 1388, which culminated in the battle of Otterburn (q.v.). Robert died at his castle of Dundonald in Ayrshire, 19th April 1390. He married first, in 1349, his mistresses, Elizabeth Mure of Tovallian, and secondly, in 1355, Euphemia, daughter of the Earl of Ross and widow of the Earl of Moray.

Robert III., king of Scotland 1390–1406, son of the preceding, was born about 1340. His baptismal name was John, but this name, out of hatred to the memory of John Baliol, was changed on his accession to the throne by an act of the Scottish Estates. His imbecility as a ruler virtually placed the reign of his uncle, in the hands of his ambitious brother, Robert, Earl of Menteith and Fife, in 1398 created Duke of Albany, during whose reign the Scottish barons first began to exercise that anarchic and disloyal authority which, in the reigns of the first three Jameses, threatened to destroy the power of the sove-
regain altogether. The principal events in Robert's reign were the invasion of Scotland in 1402, and his march to Peiwar Kabul in 1851. The expedition of the 18th century, under Archibald Douglas, which laid waste in the territory of the Hindustan Hill (q.v.). Robert had two sons, the eldest of whom was David, Duke of Rothesay (1378-1402), a youth not destitute of parts, but shocking for licentiousness. As long as his mother lived he kept within bounds, comparatively speaking; but after her death, says Buchanan, he 'reared and adorned himself, laying aside fear and shame, he not only seduced married ladies and virgins of good family, but those whom he could not entice he forced to his embraces. Albany received orders from the king to act as his guardian, and after a short time starved him to death at Falkland; for which he underwent a mock-trial by his own creatures, and was of course declared innocent. Robert now became anxious for the safety of his younger son, James, and, after consulting with Archibald Wardlaw of Sandhurst, he resolved to send him to France: but, while proceeding thither, the vessel in which he sailed was intercepted by an English cruiser, and James was taken prisoner (1405). When his father received the melancholy news he gave way to paroxysms of grief, and died at Rothesay Castle, 4th April 1406.

**Robert of Brunne.** See Brunne

**Robert of Gloucester.** See Gloucester.

**Roberts, David**, landscape and architectural painter, was born at Edinburgh (in Stockbridge) on 29th July, 1790, and was apprenticed to a house-painter. In 1818 he advanced to the grade of scene-painter, and in 1821 went to London to paint scenery for the stage of Drury Lane. All this while he was studying artistic drawing and painting, and in 1826 and 1827 he attracted the attention of the public with pictures of Rouen and Amiens cathedrals in the Royal Academy exhibitions. Then for several years he travelled in Spain, Morocco, Egypt, Palestine, Italy, Belgium, making drawings of grand and impressive buildings and landscapes with picturesque edifices, and working them up into pictures. From this work, following stand out—the drawings from Spain for the illustrations to the *Landseer Annual* (1835-38); the magnificent volumes of *The Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia* (1842); numerous interiors of churches, as *St. Miguel at Xeres*, *Holy Nativity at Bethlehem*, *St. Jean at Caen*, *St. Paul at Antwerp*, *St. Peter's at Rome*, the cathedrals of Milan and Seville; and the grandiose pictures, 'Departure of the Israelites from Egypt' (1829), 'Ruins of the Great Temple at Carthage' (1845), 'Jerusalem' (1845), 'Destruction of Jerusalem' (1849), 'Rome' (1855), and 'Grand Canal at Venice' (1856). Roberts's style is essentially spectacular, producing grand broad effects, with magnificent architectural arrangements, to which the details are of course generally lost. He was knighted in 1838, and R.A. in 1841; and died 25th November 1864. See Life by James Ballantine (1866).

**Roberts, Sir Frederick**, British general, was the son of an Indian officer, General Sir Abraham Roberts, and was born at Cawnpore on 30th September 1832. He was brought to England when two years old, educated at Clifton, Eton, Shrewsbury, and Addiscombe, and entered the Bengal Artillery in 1851. His first taste of actual warfare was got in the hot time of the siege of Delhi, during the Mutiny, and he took an active part in the subsequent operations down to the relief of Lucknow, the major-general's head quarters and the capital of the V.C. He discharged the duties of assistant quartermaster-general in the Abyssinian expedition of 1868, and in the Lashkari expedition of 1871-72. On the outbreak of the Afghan war in 1878, he was made major-general, was appointed to command the Kurrund, and occupied an important post. He forced in brilliant fashion the Afghan position on the peak of Peiwar Kotal (8500 feet above sea-level), and was rewarded with a knight-commander of the Bath (1879). After the murder of Sir Henry Rose, and the escape of the British missionaries at Kabul, he was sent the command of the force sent to avenge them. He defeated the Afghans at Charasia on 6th October, took possession of Kabul on the 12th, and assumed the government of the country, Yákub Khan having abdicated. Events followed quickly: the fortitude and devotion of Sherpur was occupied by the British army, the fortress of Balkh, then in surrender, was dismantled, Yákub Khan was sent a prisoner to India, the Afghans began to concentrate on Kabul, General Roberts sought to check them, and there was much delay, a British attack on Kandahar, which was proclaimed Assure, and General Burrows was crushedly defeated at Maiwand, and the British garrison of Kandahar besieged by the followers of Ayub Khan. On 9th August Sir F. Roberts set out with 10,148 troops, 8143 native followers, and 11,224 baggage animals on his memorable march through the heart of Afghanistan. Reaching Kandahar three weeks later, he immediately gave battle to Ayub Khan, and routed him completely, capturing all his artillery and his camp. He revisited England towards the close of the year and was honored with a baronetcy, and with a return to India he was appointed commander-in-chief of the Mudras array (1881); and in 1883-93 was commander-in-chief in India. In 1895 he was made Field-marshal Lord Roberts of Kandahar and Waterford, and commander of the forces in Ireland; he commanded in chief in South Africa in 1899-1900, and in 1900 was made a baron-in-chief of the British army. He is also C.C.S.I., L.L.D. (Cantab.), &c.

See a Life by C. R. Low (1883), but especially Lord Roberts's own work, *Forty-one Years in India* (1896).

**Robertson, Frederick William**, was born, eldest of the seven children of an artillery captain, Lieutenant William Robertson, on 1st February 1835, his first five years at Leith Fort. He had his schooling at Beverley, Tours, and Edinburgh Academy, and from the beginning was marked as an eager and imaginative child, gentle and unsuspicious, of singular purity of spirit and uprightness of character, and with an altogether unchildlike sense of the dignity of duty. After a short time of study at Edinburgh University, and a year of wearing drudgery in a solicitor's office at Bury St Edmunds, he returned to his home at Cheltenham to prepare for the army, but while awaiting his commission was applied to in a most importunate manner and of his vocation to the ministry. He matriculated at Brasenose College, Oxford, on 4th May 1857, and five days later came the offer of a commission in a cavalry regiment. At Oxford he lived a secluded life, and gave himself with fervour to the study of the Scriptures. From this time he felt no real affinity with Newmanism, but clung firmly to the Evangelicalism of his upbringing, tempered by a charity and tolerance all his own. Although he did not compete for honours, he read hard, especially in Plato, Aristotle, Butler, and Wordsworth, and admired the works of the elder Coleridge. He was ordained by the Bishop of Winchester in July 1840, and for nearly a year thereafter held a curacy at Winchester. His health now broke down at once
from over-devotion to work and a course of ascetic austerities through which, in this period of bondage to the letter, a hypersensitive conscience prompted him to seek after a higher level of Christ, and by his kicking towns on the Continent restored him to health. Masterly extended, after a short acquaintance, a daughter of Sir George William Denys. In the summer of 1842 he became curate to the incumbent of Christ Church, Cheltenham, and here for nearly five years to preach his sermons, to fight the depression of spirits, conviction of failure, and a painful and prolonged mental struggle through which he fought his way upwards to certainty in his grasp of the realities of Christian truth. His faith in Evangelicalism was first shaken by the intolerance and bitterness of its partisans, and the spiritual agony of the revolution shook his soul to its foundations, and again broke down his health. In September 1846 he set out for the Continent, and, after three months of travel and preaching at Heidelberg, returned a follower of no school to accept the curacy of St Ebbe's in Oxford. Here the power of his preaching had already made itself felt among his poor and even among the undergraduates, when in August 1847 he accepted an invitation to Trinity Chapel, Brighton. In the pulpit he was as a disciple of Christ, and his rare union of imaginative with dialectic power, the beauty and freshness of his thought, his earnestness, originality, wide sympathy, and knowledge of the human heart at once arrested public attention. He brought the reality of Jesus Christ to bear on everyday life and the perplexing social problems of the time, and pointed out the path to the true liberty, equality, and fraternity in service and discipleship as sons of God and joint-heirs with Jesus Christ. But his motives were misunderstood by many, and, especially after the excitement of 1848, he was branded for his sympathy with working-men as a revolutionist and enemy of social order, and subjected to much misrepresentation and many a cruel and unjust attack. He established the Working-men's Institute in Brighton, and taught its members how to teach their children how to read, and found himself with a passionate and chivalrous enthusiasm into every battle waged in his day against tyranny and wrong. Stern in denunciation of moral evil, he was tolerant of intellectual error, and thus his intellectual and ethical system was hitherto outside the pale of Christian sympathy. The strength and absolute sincerity of his convictions, and the broad rationality and certitude on which these were based, gave new strength to many a troubled and doubting heart, and added in almost unexampled degree the seal of power and comprehensiveness to his ministry. To him the Incarnation was the centre of all history; Christ, God's idea of human nature realised. He was no mere negative theologian, for the central point of his preaching was ever the historical reality of the life of Christ, once and for all, and the brotherhood with man. Men are sons of God by virtue of His image stamped upon them in creation; they become so de jure by baptism, but de facto by faith. The suffering of Christ makes atonement for our sins by making humanity sympathetically suffering for others; while faith converts this potentiality into an actual reality, as the foundation of union with God and the spring of Christ-like qualities within us. The characteristic fruit of faith is a pervasive love to Christ and to one another, and one of the privileges that flow from it is an elevation from the bondage of the letter, and a security in the freedom of the spirit. Hence came Robertson's honest refusal to sign the petition for an enactment against opening the Crystal Palace on Sundays—a protest against binding the chains of Judicial legalism on the Christian conscience which cost him much odium and inspired one noble sermon. Robertson grasped the idea of religious sensiveness, and the spirit of intolerance, with its unity of spirit under diversity of form, recognising that theological systems must be continually modified by new conditions of life and thought in the historical development of the ages. The intolerant spirit of absolutism is the despotism of the church, and the High Church subservience to form, as well as its search for an ideal in the Christianity of the past rather than in the present or the future, were alike repugnant to him; yet he possessed all the emotional fervour which used to be claimed as the monopoly of the one, and which he loved in his own day to recognise in the fresh enthusiasm of the other, together with the strength of thought and the philosophic breadth usually associated with the more liberal theology. He himself summed up the cardinal principles of his teaching in these propositions: (1) The establishment of pastoral truth, instead of the negative destruction of error. (2) That truth is made up of two opposite propositions, and not found in a via media between the two. (3) That spiritual truth is discerned by the spirit, instead of intellectually in propositions, and therefore Truth is more certainly to be taught actively, not dogmatically. (4) That belief in the human character of Christ's humanity must be antecedent to belief in his divine origin. (5) That Christianity, as its teachers showed, works from the inward to the outward, and not vice versa. (6) The soul of goodness in things evil.

In the pulpit Robertson's voice was low but clear and musical, with occasional startling modulations, and that peculiar thrill of suppressed emotion which is the innermost secret of eloquence. He stood almost motionless, erect, his fine face, delicate and mobile features, and deep blue eyes all eloquent in harmony with his words. Intensely sensitive as he was, all self-consciousness vanished as he spoke, his brain and heart aglow with a fire of earnestness that burned up his physical strength. He had a masterly and immaterial voice, and his sermons were a meaningless sequence of words, a slip of paper a brief abstract of the whole with merely the heads and a few of the leading thoughts. This he took with him into the pulpit, but hardly had he warmed to his subject ere it was crushed in his grasp and flung aside as useless.

During his last years Robertson suffered intense pain from a disease of the brain, which was heightened by the excitability and unrest of his temperament, and the misrepresentations that fell like blows upon a hypersensitive nervous organisation. He preached his last sermon in Trinity Chapel on 26th March 1855, but the vicar had refused on entirely inadequate grounds to confirm his nomination of a curate. After a few more weeks of cruel suffering he died, 18th August 1855, with the last words on his lips, 'I must die.' God do His work.' Eight days later he was laid in the Extra-mural Cemetery at Brighton amid the sorrow of the entire population of the town. Its citizens knew well what Stopford Brooke's biography twelve years later revealed to the wider world, that his whole life had been a passionate love to the soul of Christ.

Robertson of Brighton published in his lifetime but one sermon—the four series (1855, 1855, 1857, 1859-63) so well known over the English-speaking world, and constituting so unique a monument of religious genius, what?
not written for delivery or preservation, but are really recollections sometimes dictated by the preacher himself to the younger members of a family in which he was instructed, and written by himself for them when they were at a distance. Yet another volume, The Humus Race, &c., was issued in 1840. Other works that have also been published are Expository Lectures on St Paul's Epistles to the Corinthians (1839); Lectures and Addresses (1858); An Analysis of In Memorialis (1862); a translation from Lessing—The Education of the Human Race (1863); and Notes on Genesis (1871). The Life and Letters—the latter only in vellum to the subscribers, by the Rev. Stopford A. Brooke, appeared in 1865, and has already taken its place among the classics of English biography.

Robertson, Joseph, Scottish antiquary, was born, a small shopkeeper's son, at Aberdeen, 17th May 1804, in the Old Academy, and the grammar-school and Marischal College of his native city. An Episcopalian and Conservative, he was apprenticed to a lawyer, but took early to writing, and, after six years of literary work at Edinburgh, was a newspaper editor at Aberdeen, Glasgow, and New York through tracts, in 1833. He was in that year appointed curator of the historical department of the Edinburgh Register House, received in 1834 the degree of LL.D., and died 13th December 1866. He was an originator of the Aberdeen Spalding Club (1839–70), for which he edited the first and for forty years the publication of the Spalding Club's Encyclopaedia he wrote eighty articles (Columba, Cudlees, Cuthbert, Mary Stuart, &c.), many of which have, with revision, been retained. Of his other works may be noticed The Book of Bon Accord, or a Guide to the City of Aberdeen (1833), Catalogues of the Heads, Dresses, Books, and Possessions of Mary Queen of Scots (Bannatyne Club, 1863), the invaluable Connell Section: Ecclesie Scotiana Statuta, 1255–1559 (2 vols. Bannatyne Club, 1866), and an admirable article in the Quarterly Register for June 1840 on 'Scottish Abbeys and Cathedrals.' See the Memoir prefixed to a reprint of the last (Aberdeen, 1891).

Robertson, Thomas William, dramatist, was born at Newark-on-Trent, 9th January 1829. The family had for some generations back been actors and actresses, and young Tom was brought up almost on the boards. About the middle of the 1840's he was preparing for the stage, in which his father was connected, ceased to pay the company was broken up, and Tom proceeded to London. There he struggled for a living, acting as prompter and stage manager, writing unsuccessful plays, acting himself, writing for newspapers and magazines, was anxious to withdraw, translating French plays, and so forth; but Robertson was never an actor of any mark. His first success as a dramatist was with David Garrick, in 1864, the title role of which was one of Sothorn's great things. This was followed by the production of the comedy Society at Liverpool (1865), where, and much later in London, it was received with the warmest approval. His next comedy, Oura (1866), produced by the Bancrofts at the Prince of Wales's Theatre, London, thoroughly established Robertson's fame; and from that time his pen was kept incessantly busy. Coote (1867), Play (1868), School (1869), M.P. (1879)—all brought out by the Kendals at the Prince of Wales's—and Home (1869) and Dreams (1869), the former at the Haymarket, the latter at the Gaiety, were all equally successful. But in the midst of his triumphs Tom Robertson died, in London, on 3d February 1871. His best comedies still retain their popularity, thirty years after they were first produced. This is owing in the first place to the excellence of their construction and stagecraft, and in the next to their bright and merry humour, their wholesome, healthy tone, their happy contrasts, and the sunny spirit that shines through them. See his Principal Dramatic Works, with Memoir by his son (2 vols. 1880), and the Life and Writings, by Pemberton (1893).

Robertson, William, the historian, was born 19th September 1721, at Northwick in Midlothian, of which parish his father was minister. He went to school with Dr. Keith, at twelve entered the University of Edinburgh, and at twenty-two was ordained as minister of Glashmuir. On the sudden death of his father and mother soon after, the care of a younger brother and six sisters devolved upon him, and this duty he at once cheerfully undertook, although his income was but £200 a year. At the same time he was assiduous in preaching, in catechising, and in all the duties of his office. His vigour and patriotism he showed by joining a body of volunteers formed for the defence of Edinburgh against the Jacobite rebels in 1745, and after the surrender of the city he offered his services to the royalist commander at Haddington. As early as 1751 we find Robertson taking a prominent part in the debates of the General Assembly, and indeed his influence soon became supreme as leader of the Moderate party in the church. He was foremost in the rejection of the deposition of Glespie in the Assembly in 1752, and in 1757 the acquittal of Carlyle of Inveresk before the Synod for having been present at the performance of Home's tragedy of Douglas on the Edinburgh stage. From 1759 till his death he was joint-minister with Dr. Erskine of Greyfriars Church, Edinburgh, and in the same year he was appointed chaplain of Stirling Castle. Still further, in 1761 he became a royal chaplain, in 1762 principal of the university of Edinburgh, and in 1764 the office of king's historiographer was revived in his favour, with a salary of £200. To this time falls the magisterial patronage of the English church were held out to him, but these he was too sensible and honest to accept. All this was because of the splendid and immediate success of his History of Scotland (1753–59), which earned the warmest strangers from Hume, Horace Walpole, Lord Chesterfield, Bishop Warburton, David Garrick, and Baron d'Holbach. 'If not Dr Johnson—Sir, I love Robertson; and I won't talk of his book,' said the doctor to Boswell. Next followed the History of the Reign of the Emperor Charles V. (3 vols. 1760), to which Robertson contributed a poetic preface and Suggestive View of the State of Society in Europe from the Subdivision of the Roman Empire to the Beginning of the Sixteenth Century. This is the most valuable of Robertson's works. The field has been often since traversed by authors who have discovered much new material, but all the use they have made of it has become an indirect tribute to the natural sagacity of Robertson. He received £4500 for the copyright, and was gratified by the most flattering praises from Voltaire and Gibbon. The History of America appeared in 1771; An Historical Dissertation concerning the Knowledge which the Ancients had of India in 1791. Robertson died near Edinburgh, 11th June 1793, and was buried in the Greyfriars churchyard.

Robertson's Histories are still excellent reading, although in every case they have been left behind by the more valuable works of a later day. Their merit is great, considering the slenderness of the materials then available and the fact that he lived almost half a century before the modern conception of the scope and method of history awoke. None of his contemporaries philosophised on defective data with such success as he did within the limitations of 18th-century limitations; but it is true that many of the remarks in his review of the state of Europe display a quite remarkable sagacity and power of generalisation. His style is clear and correct, but is formal, and lacks idiomatic vigour and spontaneity.
ROBERTSON

See the short account of his life by Dugald Stewart; Carlyle's Autobiography; Brougham (a grand-nephew, who, a boy of fifteen, had stood beside the historian's ghost), Lives of the Members of the House of Time of George III.; and Lord Cockburn's Memorials of his Life and Times, for an interesting sketch of his appearance and conversation in his last years.

Robertson, REV. WILLIAM BRUCE, D.D. (born 24th May 1829, died 27th June 1880), always called to his feet as a Scotchman, was ordained to the United Presbyterian church there in 1843. As a student he had spent many hours with De Quincey, and largely owing to his advice had finished his theological course and entered the Church. Serious illness in 1871 incapacitated him from resuming regular work. Between 1871 and 1878 he was much in Italy. Thereafter he was able to undertake occasional preaching, his sermons and week-day lectures at Cambridge, 1879-81, being the most memorable. Possessed of a strong sense of humor, he could make it serve the highest ends, or could pass at once without effort or jar to the most solemn subjects. Gifted with a striking presence and a sonorous, well-regulated voice, Calvinist in doctrine, but catholic in sympathy; a staunch Presbyterian, but with a keen eye for artistic beauty of cathedrals; an ardent admirer of Luther, but a loving student of the liturgy and hymns of the Roman Church; a seer rather than a theologian, he made music and painting, sculpture and architecture all minister by illustration and analogy to the evangelical teaching of the gospel and the cross of Christ. Unfortunately he published nothing beyond a translation of the Dies Irae and one or two sacred songs.

For other poems and jetting of a few of his sermons, see his Life, by Rev. James Brown, D.D. (1889); and Robertson of Irvine, the Poet Preacher, by A. Guthrie (1889).

Robes, MISTRESS OF THE. See HOUSEHOLD.

Robespierre, Maximilien Marie Isidore, was born of a legal family, originally of Irish origin, at Arras, 6th May 1758. His mother died in 1767, his broken-hearted father two years later, and the four children were brought up by their maternal grandfather, an Arras brewer. Maximilien, the eldest, early showed unusual promise, and was educated at Arras and at the Collège Louis-le-Grand at Paris, where Camille Desmoulins was a fellow-student. He was admitted avocat in 1780 to the Solicitors' Court, and was named criminal judge by the bishop of Arras, but resigned his place soon after to avoid passing a sentence of death. All through life a fanatical devotee of the gospel according to Rousseau, his sentimentality and taste for verses made him popular among the Bowo's at Arras. He drew up the cabier or list of grievances for the guild of cobblers, and was elected to the States-General in 1789 as one of the deputies for the tiers état of Artois. He soon attached himself to the extreme Left—the 'this momentous question of the execution of a popular idol—, it was not long before his earnestness and his high-sounding phrases commanded attention. That young man believes what he says; he will go far," said Mirabeau, forecasting his future with the divination of genius. Indeed his influence grew and developed itself in the Assembly, and thousands amongst the mob of patriots outside became fanatical in their admiration of his sincere cant and his boasted incorruptibility. Three days after the death of Mirabeau he called upon the Assembly to prevent any deputy from speaking for the execution of the King. This motion in the following month (May 1791) carried the motion that no member of the present Assembly should be eligible for the next. This policy grew out of the narrow and acid suspicionfulness of his own nature, and reveals the inherent meanness of his aims and his failure to grasp that grand idea of real parliametary government by a responsible ministry, which had been the dearest dream of Mirabeau.

Next followed Robespierre's appointment as public accuser, the king's flight to Varennes (June 18th), Lafayette's last effort to control the sacred right of Insurrection on the Champ-de-Mars (17th July), the abject terror of Robespierre, his sheltering himself in the house of Duplay, a carpenter, his hysterical appeal to the Club, the trial of the club, the verdict by every member to defend his life, and his being crowned by chaplets, along with Pétion, and carried home in triumph by the mob at the close of the Constituent Assembly (30th September).

After seven weeks of quiet he sold his small property and returned to Paris, to the house of Duplay, where he remained to the last day of his life. He was much beloved in the family, and a passion quickly sprang up betwixt himself and his host's eldest daughter Éléonore, a romantic girl of twenty. The house was a charming village in which he worked and slept; it contained a few busts and portraits of himself. Alone amongst the patriots he was noted for the carefulness of his dress, which never varied in the slightest—powdered hair, a bright blue coat, white waistcoat, short yellow breeches, white stockings, white buckles. Small and feeble in frame, solitary and reserved in habits, he ever wore an anxious look upon his strained and spectacle face; his complexion was atrophical, even verdâtre; and he retained to the last the sobriety of the cynic, drinking only water.

Meantime the Girondist party had been formed in the new Legislative Assembly, its leaders—the loudest, Brissot—eager for war. Robespierre, who ever feared and disliked war, offered a strenuous opposition in the debates of the Jacobin Club, and sometimes, if sedentary, in his endless and witty harangues rose into the region of real eloquence. Fundamentally an empty pedant, inflated with words which he mistook for ideas, in his orations he is ever riding in the air on theories, his foot never on the solid ground of the practical. In April 1792 he wrote to his paper, the National Monitor. He was invisible during the crisis of the 10th August, but he joined the Hôtel-de-Ville faction, and on the 16th August we find him presenting to the Legislative Assembly its petition for a Revo- lutionary Tribunal. He was appointed to it, but did not appear, however, that he was in any sense directly responsible for the atrocious September massacres in the prisons, or more than a mere accessory after the fact. For his reward he was elected first deputy for Paris to the National Con- vention, which opened on the 21st September. The bitter attacks upon him by the Girondists were renewed only to throw Robespierre into a closer union with Denton and his party, but the final struggle was interrupted for a little by the death and defenestration of the king. Robespierre opposed vigorously the Girondist idea of a special appeal to the people on the king's death, and his execution (21st January 1793) opened up the final stage of the struggle, which ended in a complete triumph of the Jacobins on the 2d June of the same year. The Committee of Public Safety—a permanent Cabinet of Revolution—was decreed in April 1793, but Robespierre was not elected till the 27th July. He was now for the first time one of the actual rulers of France, but it is open to question whether for the whole twelve months from this time till the (3d Paris) Pétition, and not merely the stalking-horse for the more resolute party within the Twelve. His vaunted respect-ability, his great popularity with the mob, and his
gift of fluent, if vague and windy, oratory made an admirable cover for the treacherous designs of strong and completely unscrupulous men like Billaud-Varennes and Collot d'Herbois, and at least it is certain that, contrary to what Saint-Just believed, the only members whose political and social ideals coincided with his own, destitute of political intuition, without foresight or sagacity, himself the mere dupe of a few borrowed phrases, he was strong because within his narrow limits he was honest, and because he probably had a horizon of social ideals, not nakedly identical with his own advantage. He was astute enough, moreover, to play off one force against another—the Convention, the Commune, and the Committee, while he derived his strength from the constant worship of the Club.

The next scenes in the great drama of Revolution were the dark intrigues and desperate struggles that sent Hébert and his friends to the scaffold on the 24th March 1794, and Danton and Robespierre's school-fellow, Camille Desmoulins, on the 5th of May. Robespierre's most long disliked, and Channette's crazy dedication of the Goddess of Reason had filled him with disgust; Danton he at once hated and feared with that fierce and spiteful hatred he ever felt instinctively for men like the great Tribune and Vergniaud with never a secret of his room could follow me: I drag down Robespierre," said Danton with prophetic truth. The next three months he reigned supreme, but his supremacy prepared the way for his inevitable fall. He nominated all the members of the Government Committees, placed his creatures in all places of influence in the commune of Paris, sent his henchman Saint-Just on a mission to the armies on the frontier, assumed supreme control of the Revolutionary Tribunal, and completely revolutionised its method of operation by the atrocious measure introduced by his creature Cu ó thon on the 22d Priial (10th June), to the effect that neither counsel nor witnesses need be heard if the jury had come otherwise to a conclusion. The fatal significance of this change—a complete abrogation of all law—is seen in the fact that from this time till the day of Robespierre's death, the daily tale of victims that were sacrificed averaged almost thirty. But, in accordance with the law that governs all human things, as Robespierre's power increased his popularity decreased, and still further he had committed the fatal folly of making himself publicly ridiculous. Already his speech, on the 26th March, had excited derision and resentment, but his declaration on 7th May of a new religion for the state—the foundation of a new regime of public morality—awakened in the mind of Paris the numbing sense of humour.

The Convention at Robespierre's instance agreed to compliment the Supreme Being with an acknowledgment of His existence and themselves with the Consolatory Principle of the Immortality of the Soul, to be celebrated in thirty-six annual festivals. The first of these was held on the 8th of June, when Robespierre, glorious in a new violet-blue coat, walked in front of the procession and delivered his soul of a vast harangue, and sent fire to paste-board figures representing Atheism, Selfishness, Annihilation, Crime, and Vice. An old mad woman named Catherine Theot, who thought herself the mother of God, now declared Robespierre to be the new divine Sophia, and her claim was drawn upon him still further ridicule in the Convention. Meanwhile the pace of the guillotine grew faster, although apparently Robespierre hoped to bring it to a close as soon as all his more dangerous enemies, like Danton, Fouché, and Valère, were cut off. Meanwhile the public finance and the work of government generally drifted to ruin, and Saint-Just openly demanded the creation of a Dictatorship in the person of Robespierre as alone possessing intellect, energy, patriotism, and revolutionary experience enough. On the 26th July with the 8th of May, the 5th October, and the 1st February, the Dictator delivered a long harangue complaining that he was being accused of crimes unjustly. He was listened to in deep and unsympathetic silence, and the Convention, after at first obstinately passing his decrees, next rescinded them and referred his proposals to the committees, and the sitting ended without anything being concluded. That night at the Jacobin Club his party again triumphed, and the Tallien party in despair hurried to the members of the Right, the Girondist remnant, and implored their help against the common enemy of the Jacobins. In this distress the Convention Saint-Just could not obtain a hearing. Tallien, Billaud-Varennes, and Vadier vehemently attacked Robespierre, and the voice of the Dictator himself was drowned with cries of 'Down with the tyrant!' 'Turning to the Right,' I appeal to you whose hands are clean,' he cried, but the Right sat in stony silence. 'President of Assassins, I demand to be heard,' he cried, but his voice died down in his throat.—'The blood of Danton chokes him,' cried Garnier. An unknown deputy named Louchet proposed that Robespierre should be arrested, and that after the Convention Saint-Just should follow him. His younger brother and Lebas demanded to be included in the honourable sentence. Vain attempts were made by the Jacobin Club and the Commune to save their hero, but Paris refused to move, and even Henriot's artillerymen to obey. Robespierre broke his arrest and flew to the Common Hall, whereupon the Convention at once declared him out of the law. The National Guard under Barras turned out to protect the Convention, and Robespierre had his lower jaw broken by a shot fired by a grenadier named Merda, or, as many believed, by his own hand. Next day (28th July; 10th Thermidor 1794), still in his sky-blue coat, the miserable, trembling wretch died with Saint-Just, Couthon, and nineteen others by the guillotine; the day after seventy-one members of the municipality followed, twelve more on the third day, and the Reign of Terror still kept the guillotine going.

See the histories of the Revolution by Lamartine, Michelet, Louis Blanc, Carlyle, von Sybel, H. Morse Stephens, and M. Taine; the life by G. H. Lewes (1849); and especially Ernest Havel's exhaustive and authoritative work (28th July; 10th Thermidor 1794) (5 vols. 1850–67), also his Thermidor (1891).

Robin. See Redbreast. The American Robin is a Thrush (q.v.)—the Turdus migratorius; and the name of Golden Robin is sometimes given to the Baltimore Bird (q.v.).

Robin Goodfellow. See Puck.

Robin Hood, the hero of a group of old English ballads, represented as an outlaw and a robber, but of a gallant and generous nature, whose familiar haunts are the forests of Sherwood and Barnsdale, where he flees the time carelessly in the merry greenwood. He is ever genial and good-natured, religious, respectful to the Virgin and to all women for her sake, with a kind of gracious and noble dignity in his bearing. He lives by the king's deer, although personally most loyal, and wages ceaseless warfare on all proud bishops, abbots, and other ecclesiastics, and shows no respect for any right of property, distributing the spoil liberally to the poor and to all honest men in distress, of whatever degree. He is univalved with the bow and quarter-staff; but in as many as eight of the extant ballads comes off the worse in the combat with some stout fellow, whom he thereupon in desperation joins his company and the comrades are Little John, Sothelok (Scarlet), and
Much; to these the Gest adds Gilbert of the White Hand and Reynold. A stalwart curial friar, called Friar Tuck in the title though not in the ballad, fights with Robin Hood, and apparently accepts the invitation to join his company, as he appears later in two broadsides, which also mention Maid Marian. Such is the romantic figure of the greatest of English popular heroes—a kind of yeoman-counterpart to the knightly Arthur.

The earliest notice of Robin Hood yet found is that pointed out by Percy in Fiers Poeaman, which, according to Skeat, cannot be older than about 1377. Heming says in his almanac that, though but little acquainted with his patronetem, he knows 'rymes of Robyn Hode and Randolf, erie of Chestre.' In the next century we find him mentioned in Wyntoun’s Chronicle of Scotland (c. 1420); a petition to parliament in the year 1459 represents a broken man in Derbyshire taking to the woods 'like as it hadde be Robyn-hode and his meyned;' Bower, in his Scotochronicon (1441-47), describes the lower orders of his time as entertaining themselves with ballads both merry and serious about Robin Hood. Little is known of his mates, and preferring them to all others, Major and Mair (c. 1470-1500) says in his Historia Maioris Britanniae that Robin Hood ballads were sung all over Britain. The last passage gives apparently the earliest mention of those more romantic and religious ballads in which Robin Hood earned for himself a place in Fuller’s Worthies of England, under his proper county, sweet Nottinghamshire, 'not for his thievry but for his gentleness.' Yet another 15th-century mention occurs in the Paston Letters, where Sir John Paston writes in 1475 of a servant whom he had to play Robin Hood and the Sheriff of Nottingham.

Fragments of two Robin Hood plays exist, one dating from 1475, the other printed by Copland with the Gest about 1550. The latter is described in the title as 'very proper to be played in May-games.' Robin Hood was a popular figure in these, and during the 16th century, as we find from Stow, Hall, and other writers, and there is evidence that in this connection he was known as far north as Aberdeen. In place-names again we find traces of his home, his lair, his killers, his cairns, caves, and oaks from Somerset to Whithy. In the Gest the localities around Barnsdale are topographically correct, down to the place of his death at the priory of Kirkless between Wakefield and Halifax. Here the valiant outlaw is treacherously killed by his Kinswond, and the last charge to Little John is completely true to his character, and is expressed in lines of touching simplicity:

Lay me a green sod under my head, And another at my feet; And let me have my bow by my side, Which was my muse sweet; And make my grave of gravel and green, With my bow on my right hand.

There is no evidence worth anything that Robin Hood was ever more than a mere creation of the popular imagination, but in due time the yeoman became a political personage, and was transformed into an Earl of Huntingdon for whom a suitable pedigree was constructed. Both Sir Walter Scott, in Ivanhoe, and Sir Harry, in The Forest of the Tytere, make him a Saxan chief holding out like Hereward against the Normans; Bower, the continuator of Fordun, distinctly calls him one of the proscribed followers of Simon de Montfort; Joseph Hunter (1832) makes him an adherent of the Earl of Lancaster in the civil war. Finally, the scholar discovered a still further and exceptionally amusing mare's nest in the name of one Robin Hode, who entered the service of King Edward II. about Christmas 1323 as one of the 'valets, porteurs de la chamber,' and was eleven months later found unfit for his duties, and paid off with a gift of five shillings. 'To detect 'a remarkable coincidence between the ballad and the recorded requires,' says Professor Child, 'not only a theoretical prepossession, but an uncommon insensibility to the ludicrous.' Kuhn again identifies our outlaw with Woden; others with a sun-god, a woodland deity, and the like—all which subtleties of speculation are unnecessary if we readily admit that the hero of popular creative imagination may well have formed a peg round which to hang much old-world wood-lore even then fast fading into forgetfulness.

Of Robin Hood ballads there have come down to us in more or less ancient form as many as forty, of which eight may be said to be of the first importance, and more besides 'are the finest quality of ballad poetry. Of the remaining thirty-two, as Professor Child points out, about half a dozen have in them something of the old popular quality; as many not more than the least snatch of it. Fully a dozen are variations of the themes given above, sometimes sickening upon the theme 'Robin Hood and his Match.' The best of all the cycle are perhaps 'Robin Hood and the Monk,' and 'Robin Hood and Guy of Gisborne,' and both open with a delightful glimpse of the green wood a century and more before Shakespeare wrote his English poetry—

In some, when the shawe shewezy, And leaves be large and long, Hit is full merry in fayre forest To here the foulys songe.

To see the dore draw to the dale, And leve the killes hee, And shadow here in the Ives grene, Under the greene-woode to lye.

The second begins no less beautifully—

When shawe bene shene, and shreds full fayre And leveis both large and longe. Ite is merry, walking in the fayre forest, To heare the gryse songe.

The Lytell Geste of Robyn Hode was printed by Wynken de Wordre, most probably before 1500, a long poem of over 1800 lines, arranged in eight fyftes, being a not unskillful reduction of at least four earlier distinct ballads.

See Ritson’s collection of Robin Hood ballads (2 vols. 1793); J. M. Fellowes, The Lytell Geste of Robin Hode (2 vols. 1847); the Percy Folio Manuscript, vol. i. (1867), and the Introduction to the Robin Hood ballads there by Professor Hales; and especially part v. (Boston, 1888) of Professor Child’s Manual English and Scottich Ballads. The first known ‘Garland’ was printed in 1670, and in 1678 there appeared a prose version of it, reprinted by W. J. Thomas in his Early English Prose Romances (vol. ii. 2d ed. 1889).

Robin Hood’s Bay, a fishing-village in the North Riding of Yorkshire, 63 miles SE. of Whitby by the coast railway to Scarborough, opened in 1882. The bay on which it stands is picturesque fringed by lofty cliffs, rising in the Old Peak, its southern horn, to a height of 385 feet. It owes its name to traditions of Robin Hood, whose arrows shot from the tower of Whitby Priory reached Hawsker, 3 miles distant.

Robinia, a genus of trees and shrubs of the natural order Leguminosae, sub-order Papilionaceae. The most important species is the Locust Tree (q.v.), also known as the False Acacia, or Thorn Acacia, often simply designated Acacia. It is a native of North America, extending from Canada to the southern states, and is there much valued for the hardness and durability of its timber. With it, it is alleged, are the Pilgrim Fathers were, and the city of Boston founded. When green it is of soft texture, but when mature and seasoned it rivals the oak for strength and

ROBINIA 749

ROBINIA
The life of Benjamin Robins, mathematician, who was born at Beverley, was not an easy one. Robins, born in 1707, the native but time, London, splendid fortification, had 1734 Palestine, gunnery, Goethe, congrega—which In In had 1608 his middle-. 760 and suffers front. The flowers are in many hut, in large pendulous racemes. In San Domingo its flowers are used for making a distilled liquor and a syrup. The roots throw up many suckers, and are very sweet, affording an extract resembling liquorice. — *R. viscum* is a smaller tree, but even more ornamental, a native of the south-western parts of the Alleghany Mountains. It has rose-coloured scentless flowers. The young branches are viscid. — The Rose Acacia (*R. hispida*) is a native of the south-western ranges of the Alleghanies, and is a highly ornamental shrub, with hispid branches, and large rose-coloured scentless flowers.

Robins, Benjamin, mathematician, the father of the military art of gunnery, was born at Beverley, in a poor Quaker family. Having obtained a little instruction in mathematics, he prosecuted this branch of science with great zest, and, having removed to London, set up for a teacher of mathematics, and published several mathematical treatises which procured him considerable reputation. Robins next commenced his great series of experiments on the resisting force of the air to projectiles, varying his labours by the study of fortification, and invented the Ballistic Pendulum (q.v.). In 1734 he demolished, in a treatise entitled *A Discourse concerning the Certainty of Sir I. Newton's Method of Fluxions*, the objections brought by the celebrated Berkeley, Bishop of Cloyne, against Newton’s principle of ultimate ratios. His great and valuable work, the *New Principles of Gunnery*, upon the preparation of which he laboured most assiduously and for a long period, he published in 1742, and produced a complete revolution in the art of Gunnery (q.v.). In consideration of his able defence of the policy of the then government, by means of pamphlets which he wrote and published from time to time, he received, on 17th of May, 1746, the degree of Engineer-in-general to the East India Company; but his first undertaking, the planning of the defences of Madras, was no sooner accomplished than he was seized with a fever, and he died July 29, 1751. His works were collected and published in 1761.

Robinson, Edward, philologist and biblical scholar, was born at Southington, Connecticut, April 10, 1794, graduated at Hamilton College, New York, in 1816, and there resided till 1821, when he went to Andover, Massachusetts, to see through the press an edition of part of the *Hebrew*. Here he studied Hebrew under Professor Stuart, but in 1820 went to Germany, where he studied under Gesenius and Neander, and married as his second wife Jakob von Jakob, sister of a professor at Halle. In 1830 he became extra-ordinary professor of Sacred Literature at Andover, in 1837 professor of Biblical Literature in the Union Theological Seminary, New York. He now made an extensive survey of Palestine, collecting materials for his *Bible in Palestine and Adjacent Countries* (3 vols. 1841). A second visit in 1852 yielded fruit for its second edition (1856). Robinson died in New York, 27th January 1863.

His other works are a translation of Uttmann’s *Greek Grammar* (1832); *Greek and English Lexicon of the New Testament* (1836; 1856); *Harmony of the Gospels*, in Greek (1845), and in English (1846). He was also editor of the *Biblical Repository*, *Bibliotheca Sacra*, *Robinson’s Dictionary*, and a translation of Gesenius’s *Hebrew Lexicon*.

His wife, Therese Albertine Louise von Jakob, well known to the world of letters as ‘Talvi,’ a name composed of her initials, was born at Halte, January 26, 1767. At ten she went to Kirchberg, Hanover, where her father became Professor, but in 1810 they removed to St Petersburg. In 1816 they returned to Halle, and here she studied Latin, and wrote her volume of tales, *Psyche* (1825). As ‘Ernest Berthold’ she published translations of Scott’s *Black Dwarf and Old Mortality*. She was a contributor of songs, *Volkslieder der Serben* (1822–26). In 1828 she married Robinson, and in 1830 accompanied him to America. After his death she lived mostly at Hamburg, where she died 13th April 1869.

Robinson, Henry Crabb, born of middle-class parentage at bury St Edmunds on 13th May 1775, was educated there and in Dublin, and then was articled to a Colehester attorney (1790–95). He studied five years at Jena, Weimar, &c. (1800–5), making friends or acquaintances of nearly all the great German spirits of the day, and during 1807–9 was engaged on the *Times*—in Spain, and the correspondent at Madrid. In 1813, at the age of thirty-eight, he was called to the bar, from which, having risen to be leader of the Norfolk circuit, he retired in 1828 with £500 a year. In looking back on his life, Mr Robinson used to say that two of the wisest acts he had done were going to the bar and quitting the bar. Thenceforth he lived chiefly in London, with frequent tours both at home and abroad till 1863, giving and receiving much hospitality, until at the ripe age of ninety-one he died unmarried on 5th February 1867. A dissenter and a Liberal, he was one of the founders of the London University (1828), an early member of the Athenæum Club (1824). Withal he was a splendid talker, who ‘talked about everything but his own good deeds,’ a buoyant companion, an earnest thinker, a prodigious reader, content not to publish but to keep a diary. ‘I early find,’ he says, ‘that I cannot use the literary faculty to give my place among English authors as I should have desired; but I thought that I had an opportunity of gaining a knowledge of many of the most distinguished men of the age, and that I might do some good by keeping a record of my interviews with them. ‘This’ he says, ‘was not quite true, I want in an eminent degree the Boswell faculty; still, the names recorded in his great work are not so important as Goethe, Schiller, Herder, Wieland, the Duchesses Amelia and Louisa of Weimar, Tieck, as Madame de Staël, La Fayette, Abbe Grégoire, Benjamin Constant, as Wordsworth, Southey, Coleridge, Lamb, Rogers, Hazlitt, Mrs Barbauld, Clarkson, &c., &c., for I could add a great number of minor stars. And yet what has come of all this? Nothing. What will come of it? Perhaps nothing.’ Yes, something has come of it—the three delightful volumes, edited in 1869 by Dr Smillie, of his *Diary, Reminiscences, and Correspondence*, which will last as long as literature itself.

Robinson, John, pastor of the Pilgrim Fathers, was born, probably in Lincolnshire, about 1575, was a Fellow of Corpus Christi, Cambridge, and ministered to a church near Norwich. He was summoned to his Puriﬁc¬tion of Fire in 1594 by Sir Philip Sidney. In 1604 he resigned his fellowship and all connection with the Church of England, and gathered a congrega¬tion of dissenters at Gainsborough. He was afterwards a minister at Scrooby, but in 1608 he and his flock escaped to Amsterdam; in 1609 he passed to Leyden, and there in 1611 he established a
church, and in 1613 met Episcopius, Arminius' successor, in debate. In 1620, after a memorable sermon, he saw the younger members of his congregation set sail in the Speedwell (which vessel they afterwards changed for the Mayflower). He himself intended to go, but the ship which he was to sail in 1631 did, follow them to Massachusetts. He died at Leyden in March 1625. His works, with a memoir by R. Ashton, were collected in 3 vols. (London and Boston) in 1831. In 1891 a large bronze tablet to his memory was placed by the American Congregational Society on the house of Peter's, Leyden, in one of whose vaults he is buried.

Robertson, Mary, poetess, born at Leamington, 27th February 1857, resided long in Italy, and in 1888 was married to M. Darmesteter, the French Orientalist, and became a resident in Paris. Amongst her poetic works are A Handful of Honeycombs (1878), a translation of Euripides' Hippolytus (1881), The New Arcadia (1881), Songs, Ballads, and a Play (1886). She has also written Lives of Emily Brontë (1883) and Margaret of Angoulême (1880), and a historical work, The End of the Middle Ages (1889).

Robinson, John, was born at Boghill in Stirling, the son of Mr. John Robinson, a Glasgow grammar-school and university. He devoted himself early to physical science, became acquainted with James Watt and Dr Black, and succeeded to the latter's chair on his transference to Edinburgh in 1766. Four years later he went to Russia as secretary to Admiral Knowles, who had been appointed president of the Russian Board of Admiralty. In 1774 he accepted the chair of Natural Philosophy at Edinburgh, but he made an indifferent lecturer, and disliked experiments. He died January 28, 1805. His Elements of Mechanical Philosophy was edited by his brother-in-law Sir Walter Scott (4 vols.) and was followed by proof of a Conspiracy against all the Religious and Governments of Europe, carried on in the Secret Meetings of Freemasons, Illuminati, and Reading Societies (1797) is a lasting monument of fatuous credulity.

Rob Roy (Gaelic, 'Red Robert'), the Scottish Robin Hood, was born in the year 1671, the son of Lieut.-colonel Donald Macgregor of Glenlyon. Till 1661 the 'wicked clan Gregor' had for more than a century been constantly pursued with fire and sword; the very name was proscribed. But from that year until the Revolution the severe laws were less harshly inflicted against them, and Rob Roy, who married a kinswoman, Mary Macgregor, lived quietly enough as a grazier on the Braes of Balquhidder. From youth, however, he was a master of the claymore, the uncommon length of his arms giving him much advantage, for without stooping he could strike the gauntlets of his Highland hose, 2 inches below the knee. Then his herds were so often plundered by 'broken men' from the north that he had to maintain a band of armed followers to protect both himself and such of his neighbours as had been driven into exile. And so with those followers, espousing in 1691 the Jacobite cause, he did a little plundering for himself, and, two or three years later having purchased from his nephew the lands of Craigsroyston and Inversnaid, laid claim thenceforth to be chief of the clan. In consequence of losses incurred he was poitoned at Balquhidder by orders of the Duke of Montrose, his lands were seized, his houses plundered, and his wife shamefully used, turned adrift with her children in winter. Maligned by these misfortunes, Rob Roy gathered his clansmen (1722), and for a time their fortune was turned; the Duke of Montrose was bewildered and deserted; aided by the red-coats they called to their aid from Dumbarton and Stirling; besides, Rob Roy enjoyed the protection of the Duke of Argyll, having assumed the name Campbell, his mother's. Late in life he is said to have turned Catholic, but in the list of subscribers to the Episcopalian church history of Bishop Keith occurs the name 'Robert Macgregor atties Rob Roy.' The history came out in 1734, and on the 23th December of that same year Rob Roy died in his own house at Balquhidder, with the Olympic Theatre of London, where he attracted large audiences for years by his representations in comedy, farce, and burlesque. An actor of original genius, Robson excelled in parts that were grotesque, eccentric, quaintly humorous or droll; he was particularly effective in sudden transitions from comicality to pathos, and the reverse, and in the delineation of violent and tumultuous passion. He gave a vivid portrait of the street outcast as Jen Baggs in the Wandering Minstrel, in which he portrayed the once notorious thug, 'Vilkins and his Dinah.' He burlesqued Macbeth and Shylock, uniting in his playing the ludicrous and the terrible. One of his principal characters was Desmaretas, a spy of Fonchés, a shabby-looking, fawning, cunning, malicious old man in the play Pied and Passion. Others of his strongest impersonations were as the dwarf in Planché's Yellow Dwarf, the Doge of Durlato, Daddy Hardlare, Sampson Burr, and Uncle Zachary in Peter and Paul. He died 12th August 1864. See Dutton Cook in Gentleman's Magazine (1882), and G. A. Sala in Atlantic Monthly (1863).

Robur, a flameless explosive, composed of chlorinated dinitro-benzene mixed with sufficient ammonium nitrate to completely oxidise it.

Roc, or Rukh, a fabulous bird of immense size, able to carry off an elephant in its talons. The idea is familiar in the East, and every reader will remember it in the Arabian Nights' Entertainments. Coloured birds were pointed out at Peshawir in the forefrounds of the Raphia (q.v.), palms were brought from Madagascar as roc's feathers. Mythical birds of similar size and strength were the Arabian 'a'knka and the Persian simurgh. The emur or simurgh was an older Persian supernatural bird; the Indian garuda, which became the symbol of Vishnu. It has been suggested, without good grounds, that the legends of the roc might have originated in traditions of extinct birds of great size, like the
Dinonius or Ephorinis, which, however, could not fly.

Rocambole (*Allium scorodoprasum*), a plant of the same genus with garlic, onion, leek, &c., and nearly allied to garlic, which it resembles in having a bulb in all its parts. The root forms rounder cloves than those of garlic, and of much milder flavour; the umbels are also bulbliferous. Rocambole has long been cultivated in kitchen-gardens. It is a native of sandy soils in Denmark and other countries near the Baltic.

**Rocella.** See **Archila**.

**Rocha,** a southern department of Uruguay, on the coast, with Business hill; thinly inhabited, in the north a swamp.

**Rochambau.** **Jean Baptiste Donatien de Vimeure, Comte de,** was born at Vendôme, 1st July 1729, entered the army in 1742, was at the siege of Maastricht, and distinguished himself at Minorea in 1756. In 1780 he was sent out in command of an army of 6000 men to support the Americans, and in 1781 he rendered effective help at Yorktown. He became marshal in 1791, and in 1804 Napoleon made him a grand officer of the Legion of Honour. He died 10th May 1807. See his *Mémoires* (2 vols. 1836; Eng. trans. 1838).

**Rochdale,** a thriving manufacturing town of Lancashire, a municipal, parliamentary, and county borough, on the Roch, 11 miles N. by E. of Manchester and 292 NW. of London. St Chad's parish church, on an eminence approached by a flight of 122 steps, dates from the 12th century, but is mainly Perpendicular in style. It is a handsome edifice, on which £10,000 was expended in 1884–85. The town-hall, erected in 1866–71, is a very fine Domestic Gothic building. The town besides has an infirmary (1883), a free grammar-school, founded in 1565 by Archbishop Parker, and rebuilt in 1840, a free library (1834), a post-office (1875), public baths (1858), a bronze statue of John Bright (1891), and a public park of 12 acres. Still, many as are the improvements in the architectural and sanitary condition of Rochdale within recent years, it is beautiful only in site, and derives its importance chiefly from its extensive and varied manufactures. The growing of wool was added a trade in woollen goods in the days of Elizabeth, when cotton goods also were sold here, and coal-pits worked. Under the Stuarts the woollen manufacture was in full activity; but it was not till 1760 that John Street, cotton-mill, was built, in which in 1862 the father of John Bright began his career as a weaver. Flannels and calicoes are now the staple manufactures, but there are also cotton-mills, foundries, ironworks, machine-shops, &c. Rochdale is the birthplace of Co-operation (q.v.), and the membership is very large.

Pioneers' Society (1844) has increased from 28 to over 11,000, with an annual business representing more than a quarter million. Since 1832 Rochdale has returned one member to parliament, and in 1856 it was incorporated as a municipal borough. The latter in 1797 was made co-terminous with the parliamentary borough, whose boundary had been extended in 1867. The manor of Rochdale (*Rcedaram in Domusdaiy*) was originally held by the Laeys of Pontefract, and through their descendants, the Dukes of Lancaster, passed to the crown. In 1692 it was sold to Sir John Byrom, whose descendant, the poet Lord Byron (of Rochdale), sold it in 1823. Pop. of parliamentary borough (1851) 29,195; (1891) 71,498. See the history of the parish by Fishwick (1889).

**Rocher.** Sir *Boyle* (1743–1807), an Irish built-making M.P., created a baronet in 1782.

**Rochefort,** Henri, whose full style in Victor Henri, Comte de Rochefort-Luay, a stormy-petrel of French politics, was born in Paris, 29th July 1832. He studied medicine, and became a clerk in the hôtel-de-ville, but was enrolled for recruiting and now exists entirely upon journalism, contributing to the *Charivari*, the *Figaro*, and other papers, until in 1868 he started his own notorious weekly, *La Lanterne*, which was quickly suppressed by the government. To avoid fine and imprisonment Rochefort fled to Brussels, but returned in 1869 on his election to the Chamber of Deputies for Paris. He now started the *Marseillaise*, in which he renewed his bitter attacks on the imperial regime. One consequence of the cowardly murder of its contributor, Victor Noir, by Prince Pierre Bonaparte, was the suppression of the newspaper. The fall of the empire gave him his release, and opened up a role for the frothy rhetorician in the government of National Defence. In February 1871 he was elected by Paris to the National Assembly, and soon made public his Communism in the pages of *Le Mote d'Ordre*. As soon as he foresaw the end of the Commune, about the middle of May, he left his duces and comrades to their doom, and made his escape from Paris. But the Prussians caught him at Meaux and sent him to Versailles, where he was sentenced to imprisonment for life. Latter he was sent to New Caledonia, whence he escaped in 1874. In London and Geneva he tried to revive the *Lanterne* and influence the Parisian press, but at length he was enabled to return by the general amnesty of 11th July 1880. In his newspaper, *L'Intransigeant*, he showed himself as impracticable as ever, but in the National Assembly (1885–86), took up Boulangerism, and returning to France in 1895, published *The Adventures of My Life* (1896; Eng. trans. abridged, 1896).

**Rochefort-sur-Mer,** a French seaport, naval arsenal, and fortress of the first class, in the department of Charente-Inférieure, stands on the right bank of the Charente, 9 miles from its mouth, and 18 miles SSE. of Rochelle, 89 SW. of Poitiers. It was founded in 1663 as a naval station by Colbert, Louis XIV.'s minister, and fortified by Vauban, being covered now on the sea side by strong forts; and it is a well-built place, with which few French towns can compare for the number and importance of its public works. The most celebrated of these is the naval hospital (1783–88), with nearly 1300 beds, and an artistic well 2758 feet deep. There are both a naval and a harbour, both open to sea, the latter with three basins; and Rochefort besides possesses rope-walks, cannon-foundries, and other establishments for the manufacture and preservation of naval stores and marine apparatus of every kind. From 1777 till 1822 it was the seat of a great convict prison. Napoleon meant to take ship for America at Rochefort, but instead had to surrender to Captain Maitland of the *Bellerophon*, 15th July 1815. Pop. (1872) 26,619; (1891) 28,866. See Vinat and Fleury's *Histoire de Rochefort*.

**Rochefoucauld.** See **La Rochefoucauld**.

**Rochefjaquelein.** See **La Rochefjaquelein**.

**Rochelle,** a seaport and second-class fortress of France, capital of the department of Charente-Inférieure, on an inlet of the Bay of Biscay, formed by the islands Ré and Oleron, and descends to the SW. of Paris. Its harbour, which consists of a outer tidal basin and an inner wet-dock, is still sheltered by the remains of Richelieu's famous dyke, and is surrounded by fine quays, close to which lie the principal streets and squares. Many of the houses are regular and well built, and present a handsome appearance from the number of houses which are adorned with porticoes and balconies. The most
noteworthy public buildings are the hôtel-de-ville (1486-1607), the palais-de-justice (1614), and the heavy Grecian cathedral (1742–1802). Besides the fine promenade of the Place du Château, there are, outside the city, two extensive public gardens, known as the Jardin du Luxembourg and the Champ-de-Mars. Shipbuilding is actively carried on, especially in connection with the Newfoundland fishing trade; and besides this branch of industry, and the manufacture of briquettes and cotton yarn, Rochelle has glass-works, sugar-refineries, and brandy distilleries. The pop. (1872) was 23,924. Rochelle, which was known till the 12th century under its Latin name of Repella, ‘Little Rock,’ of which its present name is a mere transliteration, originated in a colony of serfs of Lower Picardy and from the persecution of their lord, settled on the rocky promontory between the ocean and the neighbouring marshes. On the marriage of Eleanor of Aquitaine with Henry II. of England, Rochelle, as part of her dowry, came into the possession of the English kings, by whom it was fortified in 1194, when it was taken by Louis VIII.; and, although it was ceded to England at the treaty of Bretigny in 1360, in the subsequent wars it was retaken by France, under whose sway it has remained since 1372. A stronghold of the Huguenots (q.v.), it was unsuccessfully besieged by an English fleet in 1627–28. In April of that year, several months again offered a heroine though unavailing resistance, under its mayor Guiot, to Cardinal Richelieu. Buckingham’s expedition to relieve it failed, and at last the defenders, reduced from 27,000 to 5000, had to surrender to the troops of Louis XIII. With the exceptions of three towers (1384–1476) its old fortifications were destroyed, and new lines of defences subsequently erected by the great Vauban. Réaumur, Bonpland, Billaud-Varenne, Fromentin, Bouguereau, and Admiral Duplex (1755–1846) were natives of Rochelle. The last a statue was erected in 1869. See Barbot’s Histoire de la Rochelle (ed. by Denys d’Aussy, 1886–91).

Rochelle Salt is the popular name of the tartrate of soda and potash (KNa₂CO₃.H₂O₄.4H₂O), this salt having been discovered in 1672 by a Rochelle apothecary named Seignette. It occurs, when pure, in colourless transparent prisms, generally eight-sided, and in taste it resembles common salt. It is prepared by neutralising cream of tartar (bitartrate of potash) with carbonate of soda. After a neutral solution has been obtained, it is boiled and filtered, and the resulting fluid is concentrated till a pellicle forms on the surface, when it is set aside to crystallise. This salt is a mild and efficient laxative, and is less disagreeable to the taste than most of the saline purgatives. From half an ounce to an ounce, dissolved in eight or ten parts of water, forms an average dose. A draught of Rochelle Salt added to one of the ingredients of an effervescing powder (bicarbonate of soda or tartaric acid, for example) forms one of the varieties of what are called Scillit powders.

Roches montonnées, smooth, rounded, hummocky bosses and undulating surfaces of rock, of common occurrence in regions which have been overflowed by glacier-ice. Those which have not been much acted upon by the weather generally show the erratics and groovings which are the characteristic markings of glacial action. Sometimes roches montonnées are smoothed and polished all over, and have the appearance of whales’ or dolphins’ backs. At other times they are smoothed on one side—that side, namely, which faces the direction from which the glaciating agent flowed; the other side, protected from abrasion, being left in its original rough, unpolished condition. The name roches montonnées is that used by the Swiss peasants—the bare rounded rocks of a valley-bottom when seen from above having a fanciful resemblance to a flock of sheep lying down.

Rochester, a city of Kent, 29 miles ESE. of London, lies chiefly on the right bank of the tidal Medway, continuous with Chatham, and joined to Strood by an iron swing bridge, constructed in 1830–50 at a cost of £170,000. The castle or keep, which crowns a steep eminence near the bridge, was the work of Archbishop William de Corbeul (1296); but the wall overlooking the river contains Norman masonry of earlier date, built upon Roman foundations. It is 104 feet high and 70 feet square, with walls 12 feet thick, and is a very fine specimen of Norman architecture; it was erected by John (1215, the south-east corner being rebuilt shortly afterwards), vainly attacked by De Montfort (1264), and taken again by Tyler (1381). Both castle and grounds were purchased in 1883 by the corporation from the Earl of Jersey. The episcopal see was founded in 604 by St Augustine, and the foundations of the cathedral then built have lately been discovered. Bishop Gundulf (1077–1107) built a new cathedral, of which part of the crypt remains. This cathedral was rebuilt by Ernulf and his successor the Count of Caen (1115–57), whose name remains; and the choir was enlarged in the 13th century in part out of offerings of pilgrims at the shrine of St William of Perth, a Scotch baker, who, on a pilgrimage to the Holy Land, was murdered near Chatham by his companion and adopted son; the tower rebuilt by Cottingham (1225–26), the choir and transepts restored by Scott (1871–77), and the west front being restored by Pearson in 1891. It measures 306 feet in length, and has double transepts; and special features of interest are the Norman west doorway and nave, the fine English choir which were naves, and early character, the spacious crypt, and a fine Decorated doorway leading to the modern library. The ruins of an early Norman keep or residence (?) built by Gundulf, the architect of the Tower of London, stand on the north side of the choir. Of Rochester’s bishops since 604, some eighty in number, may be mentioned Paulinus (previously first bishop of York), Gundulf, Walter de Merton, Fisher, Ridley, Atterbury, and Horsey. St Bartholomew’s Hospital, founded by Gundulf in 1075 for lepers, has been destroyed; while the Norman chapel remains. Watts’ Charity House, founded in 1579 to lodge ‘six poor travellers, not being rogues or proctors,’ has been immortalised by Dickens, whose home, Gadshill (q.v.), is 3 miles distant, and who introduces Rochester into Pickwick, Edwin Drood, and others of his novels. Three schools are the cathedral grammar-school (Henry VIII.), Williamson’s mathematical school (1701; reopened under a new scheme, 1880), and a grammar-school for girls (1888); and other buildings are Satchville House, Restoration House (Charles II. slept here in 1660), the guild-hall (1687), and the corn exchange (1871). Rochester— the Roman station Durobrivae and Anglo-Saxon Hræfes-ceaster —was made a municipal borough by Henry II. It lost one of its two members in 1885. James II. disembarked here on his Flight to France (1688). Pop. (1851) 16,508; (1871) 18,352; (1891) 20,170.

See Wharton’s Anglia Sacra (1691); Thorpe’s Register Roffense (1769) and Custumals Roffense (1781); and other works by Rawlinson (1717), Fisher (1772), Rye (1821), Watts (1786), Atterbury (Dickens and Rochester, 1889), and Pearman (1898).

Rochester, (1) capital of Monroe county, New York, is on both sides of the Genesee River, 7 miles above its entrance into Lake Ontario, and rail the Erie and Genesee Valley canals, by rail 67 miles ENE. of Buffalo and 300 NW. of New York.
ROCHESTER

The river has here three perpendicular falls of 90, 26, and 83 feet, and affords immense water-power.

The city is well built, and laid out with almost unbroken regularity. Among the principal buildings are the city hall, of blue limestone, and the court-house; a state industrial school (formerly a house of refuge), with accommodation for 900 boys and 400 girls; numerous churches, including a Roman Catholic cathedral; the Free Academy, and the university (founded 1850, and under Baptist control), and a Baptist theological seminary (whose library of 21,000 vols. includes that of Neander). There are thirty graded public and many private schools, libraries, arsenals, hospitals, &c. But the most noteworthy structure in the city is the handsome stone aqueduct of seven arches (850 feet long) by which the Erie Canal crosses the river. The principal industries are flour-milling, which has always been extensively carried on here, and the manufacture of ready-made clothing and boots and shoes, rubber goods, furniture, carriages, agricultural implements and machinery, steam-engines, glass, cigars, tobacco, perfumery, &c.; and there are besides numerous foundries, iron-works, cotton-mills, wool-mills, machinery, and flour-milling establishments. In the neighbourhood there are great nurseries, and in the city large seed-packing establishments. Rochester is a port of entry, and has a considerable trade both by lake and rail. It was settled in 1810, incorporated in 1834, and in 1890 was, in order of population, the twenty-second city of the United States. Pop. (1840) 20,101; (1860) 48,294; (1890) 133,896; (1900) 162,435.—(2) Capital of Ogle county, Illinois, on the Zumbro River (crossed by three iron bridges), 947 miles by rail NW. of Chicago. It has flour-mills, foundries, and manufactory of furniture, farming implements, &c. Pop. (1900) 6343.—(3) A city of New Hampshire, 21 miles by rail NW. of Portsmouth, with good water-power, and manufactures of flannel, blankets, shoes, &c. Pop. 8486.—(4) A borough of Pennsylvania, at the junction of the Ohio and Beaver Rivers, 25 miles by rail NW. of Pittsburgh, with deposits of coal, oil, &c., and various manufactures. Pop. (1900) 4688.

ROCHESTER, JOHN WILMOT, EARL OF, the Wittiest reprobate at the court of Charles II., was born at Ditcheley in Oxfordshire, 10th April 1647, and educated at Burford and Wadham College, Oxford. He next travelled in France and Italy, and on his return repaired to court, where his handsome person and lively wit quickly made him a prominent figure. In 1665 he showed conspicuous courage serving under Sandwich against the Dutch, as well as the summer after under Sir Edward Spragge—facts which agree ill with the stories that he would sink away in street quarrels and evade duels which he had himself provoked. With a friend, Mr Windham, he had entered into a formal engagement that, 'if either of us were killed, the other would apprise the world of the notice of the future state, if there was any.' Windham was killed in an attack upon Bergen, but did not afterwards disturb the rest of his friend, who now plunged into a life of the grossest dec. licence, was for five years together continually drunk, and revolved himself to letters, writing personal satires, buccannahian and amatory songs, and too often obscene and licentious verses, many of which, however, were doubtless fathered on him after his day. In these wild excesses he hazed out his youth and his health, till at the age of one and thirty he had exhausted the fund of life. On his death-bed he was convinced of the necessity of repentance by the arguments of Bishop Burnet, who writes: 'I do verily believe he was so entirely changed, that if he had recovered he would have made good all his resolutions.' He died 26th July 1686. His last conversations are touchingly described by Burnet in Some passages of the Life and Death of John, Earl of Rochester (1680; in vol. iv. of Wordsworth's Ecclesiastical Biography), a book, says Dr Johnson, 'which the critic ought to read for its elegance, the philosopher for its arguments, and the satirist for its grace.'

Rochester's verses show more wit than poetry, but he possessed in rich measure the gift of satire. An excellent example of this is his memorable epistle on Charles I.:—

Here lies our sovereign lord the king,
Whose word no man relies on;
He never said a foolish thing,
Nor ever did a wise one.

Equally well known is the description—'a merry monarch, scandalous and poor,' the line rhyming with which it is characteristically impossible to quote. But Walpole's judgment of his work is thus expressed in Royal and Noble Authors: 'Lord Rochester's poems have much more obscurity than wit, more wit than poetry, more poetry than politeness.' Before his death he expressed a wish that his indecent verses should be suppressed, but that very year these, and much more, were published ostensibly at Antwerp, really at London. Among the best of his poems known to be genuine are an Imitation of Horace on Lucullus, Verses to Lord Mulgrave, a Satire to Mann, and Verses upon Nothing.

ROCHESTER, VISOUNT. See KE, and OVER-BURY.

ROCHE-sur-YON, capital of the French department of Vendée, on the Yon, 50 miles SSE. of Nantes by rail, has a prefecture, lyceum, library of 12,000 volumes, a museum, and a theatre. Napoleon selected it in 1805—then a mere village to be the departmental capital. From 1815 to 1848 it was called Bourrier, and from 1848 to 1870 Napoleon-Vendée. Pop. 8789.

ROCHET (Low Lat. rochetis; Old High Ger. roch, 'cont.'; Ger. rock), a fine linen or lawn vestment proper to bishops and abbots, and worn also by canons of certain privileged chapters, and some other dignitaries. It is of the form of a surplice, but with sleeves fastened at the wrist; these formerly fitted more tightly to the arm than do the 'balloon sleeves' still commonly worn by Anglican bishops. In the Latin Church its use is very ancient. Formerly it appears to have been worn by clerics serving mass and by priests baptising, because it left their arms free (Lyndwood, quoted by Du Cange); but those priests who are privileged to wear the rochet are now commanded to regard it as a choir vestment, and are strictly forbidden to use it in the administration of the sacraments. In the First Prayer-book of Edward VI. the rochet was ordered to be worn at all public ministrations, and beside—i.e. over it—a surplice or alb. It is prescribed in the present Book of Common Prayer as part of the episcopal habit. The old 18th-century Anglican fashion of fastening the sleeves of the rochet to the chimerre—leaving the rochet itself sleeveless—is almost gone out.

ROCK. Though popularly restricted to masses of indurated matter, this term is extended by geologists to all substances which make up the crust of the earth, whether they be loose and friable like sand and soil, or compact and indurated like limestone and granite. The rocks of the earth's
crust (aqueous, igneous, metamorphic, &c.) will be found described under numerous distinct headings in this work. See the classification given at Petrography, and the article GEOLOGY, with the list appended, including such articles as DENUDATION. See also BUILDING STONE, BLASTING, BONG.

Rockall (in old maps Rocal, Rococh, &c.), on a deeply covered sandbank in the Atlantic 50 miles long and 25 broad, in 57° 36' N. lat., 13° 42' W. long., 160 miles W. of St Kilda, 290 from the nearest point of the Scottish mainland, and 290 from the north of Ireland. It is an isolated conical gravel island, rising 70 feet above the sea, and about 100 yards in circumference. At a distance it looks like a ship in full sail, the upper part being white with the dung of seafowl, and the lower part dark stone. This curious peak is further from the mainland than any other rock or islet of like size in any part of the world. Martin, in his St Kilda (1698), mentions that a crew of Frenchmen and Spaniards, shipwrecked at Rockall in 1685, escaped in their pinasse to St Kilda. The first landing known was in 1810. Vesuvius is the only other volcanic rock in use, in the case of a fission for fish-ponds from Scotland and from Grimby. See the account of a scientific expedition thither in 1890 in an article by Mr Miller Christy in the Royal Scottish Geographical Magazine for 1898.

Rock-basins, a name given by Sir Andrew Ramsey to limestone hollows in rock which have been excavated by glacier-ice. See LAKE.

Rock-butter, an impure alum efflorescence of a butter-like consistency found oozing from some alum slates.

Rock-crystal. See QUARTZ.

Rocket. A cylindrical case of paper or metal partially filled with an inflammable composition (saltpetre 68 parts, sulphur 32 parts, charcoal, or mealed powder, 32 parts), so that a large conical hollow is left inside. The base is open or has vents in it, and the head closed. On being ignited this composition burning over the whole surface of the hollow portion at once causes a great rush of gas outside the base, thus driving the rocket forward with great and increasing velocity. Rockets are used for signalling and to carry a light line for life-saving purposes (see LIFE-SAVING APPARATUS). Early in the 13th century they began also to be used in war. Sir William Congreve in 1698 introduced throw rockets as large as 24 lb. in weight, with thick iron heads adapted to act like a shell. They were fired from a tube and steadied in their flight by means of long sticks. In the more modern Hale rocket a rotary motion is given by causing the gas to pass out of the vents in the base before and between two projecting shields, shaped somewhat like the blades of a screw-propeller, against which it presses. The cumbersome stick is therefore no longer used, and the rocket is fired from a low trough with tripod stand, or even from the ground, by raising a mass of gas sufficient to give the required range, which may be as much as 4000 yards. Though extremely portable as compared with other missile weapons of similar power, rockets are so uncertain in their flight that they are not much used, except for incendiary purposes and for the making of a smoke screen. Against cavalry they would be very useful if they could be depended on. The rocket troop of the Royal Horse Artillery did very good service in the Peninsular war, however, and ships' boats, which could not carry a gun firing a 24-pound shell, could carry rockets charged with the weight into a place under bombardment. See PYROTECHNY.

Rocket, a name given to a number of plants of the natural order Crucifera, and belonging to the genera Brassica, Sisymbrium, Erysimum, Barbarea, Hesperis, &c. Garden Rocket (Brassica Hyacinth, or Erucia sativa) is an annual plant, a native of Austria, with stem 2 feet high, upright and branching; the leaves smooth, succulent, cut and toothed. When in flower it has a strong, peculiar, and disagreeable smell; but when in fruit this smell is almost imperceptible, and the leaves are used as a salad, for which it is frequently sown on the continent of Europe, and was formerly cultivated also in Britain. The name Garden Rocket is given also to Hesperis matronalis, also called Dame's Rocket [Hesperis matronalis], a little biennial or biennial in its growth, but sown as an annual, for which reason, our flower-borders. The Yellow Rocket of our flower-borders is a double-flowered variety of Bar- barea vulgaris (see CRESS). The Wild Rocket (Sisymbriun officinale, or Erysimum officinale) is common in Britain, and is sometimes sown and used as a spring potherb.

Rockfish. See Wrasse.

Rockford, capital of Winnebago county, Illinois, is on both sides of the Rock River, 80 miles by rail WNW. of Chicago. It is a well-built town, with shady streets, and contains foundries, flour, paper, cotton, and woolen mills, and manufactures of some local interest, such as slabs, pumps, chucks, furniture, cutlery, and plaited wickerwork. See the account of a scientific expedition thither in 1890 in an article by Mr Miller Christy in the Royal Scottish Geographical Magazine for 1898.

Rock-hamilton, a town of Queensland, Australia, situated on the south bank of the Fitzroy, 35 miles from its mouth, and 420 NW. of Brisbane. The town has main streets, lined with trees, and many substantial buildings, including the government offices, hospital, and town-hall. It owes its beginning (1858) to the extensive gold-fields in the neighbourhood, the annual yield of which is valued at $1,000,000 to 2,500,000; copper and silver are also worked to some extent. The land around is well adapted for grazing. The industries include tanning, soap and boot making, and meat-preserving. The chief port for central Queensland, its trade in exports (one-third) and imports reaches an annual value of 21,500,000. A bridge across the Fitzroy, with five spans of 232 feet each, connects Rockhampton (pop. 7431) with its suburb North Rockhampton (pop. 1700).

Rockingham, Charles Watson WENTWORTH, MARQUIS OF, a statesman of importance beyond his abilities, was born in 1730, the only son of that William Wentworth who succeeded in 1746, and was created marquis the same year. He had his education at Eton, was created Earl of Malton in the Irish peerage in 1750, and succeeded his father as second Marquis of Rockingham in December of the same year. In 1751 he was nominated lord-lieutenant of the North and West Ridings of Yorkshire, and in 1760 made Knight of the Garter, but soon found himself in opposition to the policy of the young king George III, and his favourite minister, Dute, and was disgraced from the lord-lieutenany in 1762. He found himself leader of the combination of Whig opposition, after the Duke of Devonshire's death in 1764, and in July 1765 was called on to form his first ministry. He repealed the Stamp Act, and would have done more for property but for the division of the court, added to the defection of the Duke of Grafton and his own want of influence in parliament. Rockingham resigned in August 1766, and remained out of office sixteen years in opposition to Lord North and the ruinous policy that led America. He was created Duke March 1782, with Fox and Shelburne as his secretaries, but died 1st July of the same year. See the Memoirs by the Earl of Albemarle (2 vols. 1832).
Rocking-stones, or Logans, are large masses of rock so finely poised as to move backwards and forwards with the slightest impulse. They occur in nearly every country. Some of them appear to be natural, others artificial; the latter seem to have been formed by cutting away a mass of rock round the centre-point of its base. The former are chiefly granitic rocks, in which felspar is abundantly present; for, this mineral being readily decomposed, the rock becomes disintegrated to grit, sand, and dust, which are carried away by rains and wind, so that what was formerly a solid rock soon assumes the appearance of a group of irregularly-shaped pillars, separated into portions by horizontal and vertical fractures. As decay proceeds, the edges of the blocks forming the pillar are first attacked and disappear, and the pillar now becomes a pile of two or more spheroidal rocks, resting one upon the other. Should a mass of rock be so situated as to preserve its equilibrium in spite of the gradual diminution of its base or point of support, a rocking-stone or logan is the result. Although rocking-stones are most frequently of a granitic nature, they occur also among basalts and other crystalline igneous masses. For the principle regulating the stability of equilibrium of rocking-stones, see Stability. Various explanations have been given of the uses of these singular objects. They are supposed to have been used in very early times for purposes of divination, the number of vibrations determining the oracle; hence it came to be believed that sanctity was acquired by walking round them.

Some rocking-stones occur near to remains of ancient fortifications, which seems to bear out a statement in one of the poems of Ossian, that the bards walked round the stone singing, and made it move as an oracle of the fate of battle. In Greece rocking-stones occur as funeral monuments, and are generally found on conspicuous places near the sea. Rocking-stones are numerous in Yorkshire, Derbyshire, Cornwall, and Wales. The famous Logan Rock, near Land's End, in Cornwall, is computed to weigh over 70 tons. It was wantonly displaced in 1824 by Lieutenant Goldsmith, R.N., and his boat's crew of nine men. He had to replace it at a cost to himself of £2000; but whether it has since rocked as well as ever is a moot point. Near Warton Crag, Lancashire, are no less than seven of these stones; and in Scotland they occur in the length by 10 feet in breadth, and rising for about 10 feet out of the water, swings to and fro with the motion of the sea, which is about seven fathoms deep. All these, however, are as marbles compared with the rocking-stone of Tandil in the Argentine Republic, 250 miles S. of Buenos Ayres, for this weighs over 700 tons, yet is so nicely poised that it rocks in the wind, and may be made to crack a walnut. See Frank Vincent's Around and About South America (1890), from which our illustration is copied.

Rock Island, capital of a county of that name in Illinois, on the Mississippi, opposite Davenport, Iowa (the two are connected by a wrought-iron bridge which cost $1,300,000), 181 miles by rail WSW. of Chicago. The island from which the town is named belongs to the United States, and is used as a public park; on it the government has erected a great arsenal and armory. The channel to the east of the island has been dammed so as to furnish immense water-power, and the city has flour and saw mills, besides foundries, machine-shops, glass-works, &c. Pop. (1880) 11,659; (1900) 19,493.

Rockland, (1) capital of Knox county, Maine, on the west side of Penobscot Bay, 58 miles by rail ENE. of Portland. The Boston and Bangor steamer touches here. The city has granite quarries, and many lime-kilns; it ships a million casks of lime yearly, and the New York post-office and St Louis custom-house are among the structures built of its granite. Shipbuilding is carried on, and there are iron and brass foundries, &c. Pop. (1890) 8190.—(2) A town of Massachusetts, 12 miles by rail SSE. of Boston, has large manufactories of boots, shoes, and tacks. Pop. (1890) 5327.

Rockland Lake, near the Hudson, 30 miles N. of New York City, is 3 miles in circumference, and furnishes 200,000 tons of ice annually.

Rockling (Onas), a genus of fishes of the Cod family Gadidae, represented on the British coasts by several species distinguished among other things by the number (3-5) of barbels. The larger species reach a length of 17 inches; but none are of any value as food, their flesh acquiring an unpleasant smell a few hours after being taken out of the water.

Rock-oil. See Petroleum.

Rock-plants, in Gardening, a term applied to a very numerous group of plants, which by their habit of growth are adapted to adorn rockeries. The plants are generally of lowly habit, either tufted, creeping, or trailing. They may be shrubby or herbaceous perennials, and certain annuals of trailing habit are occasionally used for temporary effects. But the more restricted use of the term comprehends merely the numerous species of Alpine plants (p. v.) and such as resemble these in their habit and adaptability to the purpose in view—the clothing of rock-work with verdure and

Three-bearded Rockling or Sea Loach.
ROCKY MOUNTAINS 787

with flowers in initiation of the natural conditions in which the Alpine flora appears in Alpine regions and in high latitudes.

Rock River rises in the south-eastern portion of Wisconsin, and flows south into Illinois, then south-west, and empties itself into the Mississippi 3 miles below Rock Island. Its course of 375 miles, much broken by falls, is through a region noted for its beauty and fertility.

Rock-rose. See CISTUS.

Rock-salt. See SALT.

Rock-soap, a mineral consisting of silica, alumina, peroxide of iron, and water, the silica nearly one-half, the alumina and the water sometimes nearly each one-fourth of the whole. It is earthy, easily broken, black or nearly so, very soft, and easily cut with a knife; is greasy to the touch, and adheres strongly to the tongue. It is valued by painters for crayons. It is found in Poland, Thuringia, and Bohemia, and occurs in basaltic rocks in the Isle of Skye and Antrim, in the form of nodules of a greenish-gray or brown colour. It is only found massive.

Rock-temples. In many parts of Western Asia, as at Ellora, Elephantia, Karli, and Salsette Island, natural rocks have been cut into temples; as at Petra (see the illustration). Out of India well-known instances of the same kind occur at Petra (q.v.) in the Arabian Desert, at Abu-Simbel (q.v.) in Egypt, and in China and Siam. There are remarkable cave-temples in the United States, one in Missouri, between the Salt River and Otter Creek; another near Manchester in Ohio. The rock-dwellings of Colorado, &c., are described at CAYE. See James Ferguson, Rock-cut Temples of India (1864), with seventy-four photographs by Major Gill.

Rocky Mountain Goat (Aplocerus), a beautiful animal of the antelope family, which inhabits the heights of the Rocky Mountains between the forests and the snow-line, from the 44th to the 65th degree of latitude. It is about the size of a goat, but is handsomer and more thickset, and has stronger legs. It is completely covered with long, thick, white hair, which forms an erect mane along the back from the horns to the root of the tail. Though it is hunted by the trappers, its flesh is not valued as food. The above species and the Prong-horned antelope (Antilocapra) are the only antelopes which occur in the New World. For the Rocky Mountain Sheep, see ARGALI SHEEP.

Rocky Mountains, formerly a name somewhat loosely applied to all the mountains of North America between the Great Plains and the Pacific Ocean, but now a term used designating only the eastern ranges of the great Cordillera system. This vast mountain-system acquires its greatest breadth within the limits of the United States, where between the parallels 38° and 42° N. lat. it attains a width of more than 1000 miles. Toward the north and the south the plateaus of this high-land gradually diminish in breadth, but they are enclosed on the east and on the west by high mountain-chains. Those forming the western boundary are the Sierra Nevada and the Cascade Ranges (q.v.), and the eastern chains stretching with uninterrupted continuity from the southern borders of the continent to the Dominion of Canada and to the Arctic Ocean constitute the Rocky Mountains. Between these eastern and western boundaries the plateau region is greatly diversified by chains which, as a rule, trend in the same general direction as the border ranges.

The name 'Rocky Mountains' is peculiarly appropriate, as there probably exists nowhere else such an extensive region of naked rock almost entirely devoid of vegetation. The geological structure is complex, but the greater part of the rocks exposed are Mesozoic intermingled with Tertiary and Quaternary deposits. As this system is consequently of much more recent origin than the Appalachians, it is naturally higher, and it presents also a sharper and more rugged outline. Its remarkably barren aspect is due to other geological peculiarities and to climatic causes. In comparatively recent ages this whole region has been the scene of vast volcanic eruptions, and the lava overflows which have covered the stratified rocks in many places to a depth of thousands of feet have augmented the expulse of sterile surface. By resisting the erosion of the streams and of the atmosphere, these lava beds have also greatly aided in producing the precipitous and deeply furrowed watercourses by which this wonderful plateau region is separated. Rocks or mountain barrier at the western boundary of the highland robs the winds which sweep across the Pacific of much of their moisture, and the great aridity of this region thus prevents the growth of vegetation. The surface is consequently exposed to continued erosive action, which is specially effective at the greater elevations. The denudation is the more complete as the sand and smaller disintegrated fragments are swept away by the winds, and no opportunity is afforded for the accumulation of a soil. On account of this circumstance the surface of the extreme western portion of the surface is uneven, and the region displays a labyrinth of naked crags and peaks arising from plateaus crossed by towering cliffs or deep canyons, with here and there an isolated butte. The scenery of the wonderful mesa or plateau region which lies between the United States and western Mexico, the Rocky Mountains, and extends from southern Wyoming through western Colorado, eastern Utah, and south into New Mexico and Arizona, is unequalled by that of any other portion of the globe. The country is divided by faults, flexures, and deep canyons into numerous plateaus and the wonderful carving of the rocks and the brilliant colouring of the exposed strata almost surpass belief.

A high plateau region in Wyoming, over which geese the Grand River Railroad, marks a separation of the Rocky Mountains into a northern and a southern group, each of which has its characteristic features. The continental divide which extends north and south with the ranges of the Rocky Mountains culminates in this plateau, where are found the extreme head-water streams of the great river-systems of the United States—the Mississippi, the Columbia, and the Colorado. The ranges of the southern group have a general north and south trend, and are higher than those of the northern group. As there are several elevated valleys known as Parks enclosed between the parallel ranges, this group is sometimes known as the Park System. It extends southward from the Laramie Plains across central Colorado into New Mexico. Its greatest development is in Colorado, where there are nearly forty peaks each over 14,000 feet in height. The Medicine Bow Range and the Colorado or Front Range form the eastern edge of the Rocky Mountain System, and rise abruptly from the gentler slope of the Plains. In this range are the well-known landmarks, Long's Peak (14,271 feet) and Pike's Peak (14,341 feet), as well as the Peak (14,341 feet), its highest point, which is too far west to be visible from the Plains. This range forms the eastern wall of North, Middle, and South Peaks, and the Park Range constitutes their western boundary. To the west of the southern end of the Park Range lies the Sawatch Range,
with the famous Mount of the Holy Cross (14,176 feet) and Mount Harvard (14,375 feet). Farther south are the San Juan Mountains, which constitute the western boundary of San Luis Park. To the north and west of this range lies a high broken country merging into the mesa region of western Colorado and northern New Mexico. The highest point of this section is the culminating point of this section. The eastern border of San Luis Park is formed by the Sangre de Cristo Range, which is almost a continuation of the Sawatch. Its loftiest summit, Blanca Peak (14,463 feet), is the highest point of the Rocky Mountains. The Elk Mountains and the Sawatch Range are marked with sharp volcanic peaks, lie to the west of the Sawatch Range. In the Parks rise the head-waters of the North and the South Platte, the Arkansas, the Grand, and the Rio Grande. Beside these large parks there are among these ranges many smaller but beautiful valleys. West of the Park Range are the Uintah Mountains, composed of a broad fold of thick strata, of which the Upper Tertiary and Cretaceous layers have been eroded to the depth of more than 3 miles, exposing the underlying Carboniferous rocks. This range has an east and west trend, and connects the eastern and western ranges of the Rocky Mountain System. The most important of the western ranges are the Wallowa Mountains, which form a part of the eastern rim of the Great Basin (q.v.), and which serve as the connecting link between the northern and southern groups of this system. The greatest development of the northern group is in Wyoming. The Wind River Mountains are the highest of the ranges, with Fremont's Peak (13,790 feet) as the culminating point. To the west are the Tetons, Mount Hayden (13,681 feet), and Mount Owyhee, which separate the head-waters of the northern group are wilder and less accessible than those of the southern chains, but not so high. They also present scenery which is less varied; they are not so definitely marked by regular ranges, and there are but few prominent peaks except in the groups already mentioned and in the geyser region of the Yellowstone. In Idaho and Montana there are numerous enclosed mountain valleys, which are called 'Parks' or 'Prairies,' but they are not so high as the 'Parks' of Colorado. The Bitter Root Mountains form the divide between the head-waters of the Missouri and those of the Columbia, and also between the tributaries of Clarke's Fork and of the Snake River. The Lapwai and Cœur d'Alene ranges, which lie to the west and northwest, connect the Rocky Mountains with the Blue Mountains, and between these groups and the Cascade Range are the Great Plains of the Columbia River. Yellowstone Park (q.v.), in the northwestern part of Wyoming, is famous for its hot springs, geysers, mud volcanoes, and its wonderful scenery. The disposition of the mountains toward the east is peculiar, as they occur in more or less detached groups, and which are the Crazy Mountains, Judith Mountains, and the Big Horn Mountains. Still farther east are the Black Hills, completely detached from the main system, and noted for their mineral wealth. Beyond the Canadian line too little is known of the Rocky Mountain System to warrant a description. Mount Hooker and Mount Brown seem to be but little over 9000 feet high instead of 15,000 feet. The highland gradually descends towards the north, reaching an elevation of about 800 feet in the vicinity of the Arctic Ocean, and in the northern ranges form the divide between the head-waters of the Mackenzie and Yukon Rivers.

**Rococo**, or **Rocaille**, a name given to the very debased style of architecture and decoration which succeeded the first revival of Italian architecture. It is ornamental design run mad, without principle or taste. The ornament consists of panels with their moldings broken or curved at the angles, and filled with foliage, shell-work, musical instruments, marks, &c. This style prevailed in Germany and Belgium during the 18th century, and in France from the time of Henry IV. to the Revolution. The illustration shows an example from an altar in the church of St James, Antwerp.

**Rocroi**, a third-class fortress of France, department Ardennes, 24 miles N.W. of Sedan, and 2 from the Belgian frontier. It is situated in the forest of Ardennes. Pop. 1791. Here the Great Condé (q.v.) broke the reputation of invincibility long enjoyed by the Spanish infantry, May 19, 1643.

**Rod**, called also a **pate**, or **perch**, a measure of length, equivalent to 64 yards, or 161 feet. The square rod, called generally a **rood**, is employed in estimating masonry-work, and contains 10¼ × 10¼, or 272¼ square feet.

**Rödbertus, Johann Karl**, designated the founder of scientific socialism, was born the son of a professor at Greifswald on 12th August 1805, and studied law at Göttingen and Berlin. For a few years he held law appointments under the Prussian government, but in 1836 settled down on his country estate at Jagetzow in Pomerania, and turned his attention chiefly to economic studies. In 1848 he was elected a member of the Prussian National Assembly, and for a fortnight filled the post of minister of Worship and Education; in the following year he carried the adoption of the Frankfort constitution for the empire, but retired from public life when the Prussian electors were grouped in three separate classes. He died on 6th December 1875. Although a socialist, Rödbertus was not a demagogic agitator: he believed that the socialistic ideal would work itself out gradually according to the natural laws of change and progress. Indeed he fixed upon five centuries as the time it will take to educate the people, the democracy, up to the socialistic ideal. When that ideal is realised the state will be the owner of all the land and capital of a country, and will superintend the distribution of the total products of human labour amongst those who do the labour, apportioning to each a share corresponding to his work. (His fundamental economic principle was of course that labour is the true and only source of wealth.) In the meantime he would not interfere with the working of the established laws of capital and land, nor with the principles of monarchical government. On behalf of the workers he advocated that the government should fix a normal working-day.
RODENTIA

a normal day's work, and a maximum and minimum of wages. His views are laid down in Zur Kenntniss unserer staatswirtschaftlichen Zustande (1842), Soziale Briefe (1850–51 and 1854), Zur Erklärung der Kreditnot des Grossbesitzes (1868–69), Der Normalarbeitsag und other papers in Tübinger Zeitschrift (1875 et seq.), and others in Jahrbücher für Nationalökonomie.

HIs Briefe and Aufsätze were edited by R. Meyer (2 vols. 1892), and his Kleine Schriften by M. Wirch (Beit. 1890). See monographs by K. Adler (1894) and Dietzel (1886–88). See also Soc. Linn.

Rodentia (Lat. 'gnawers'), an order of Mammals more rich in species than any of the others, including among its familiar representatives squirrels, marmots, beavers, rats and mice, lemures, porcupines, guinea-pigs, hares and rabbits. Most are terrestrial, and many are herbivorous, but a few are arboreal or even semi-aquatic. All are vegetarian, and gnaw their food. They are represented in all parts of the world.

Among the anatomical characteristics of Rodentia may be noted the chisel-like edge of the incisor teeth, which wear away in front less rapidly than they do behind, where the enamel coating is thinner or absent; the reduction of the incisors to two above and two below, except in the hares and rabbits, in which there are four above; the fact that the incisors and sometimes the back teeth also are rootless, and continue growing from persistent pulps; the absence of canine teeth, and the presence of a large space between incisors and premolars; the condyle in which the lower jaw works is elongated from before backwards—an adaptation to the peculiar motion of the lower jaw characteristic of rodent gnawing; the cerebral hemispheres are smooth, and leave the cerebellum uncovered; the intestine, as in many herbivorous animals, has a large cecum; the uterus is two- horned, the placenta discoidal and deciduate; the reproduction is in many cases very prolific.

Classification. — Sub-order Simplidíntata—with only one pair of upper incisors, having enamel only in front. This sub-order includes squirrels (Sciurus), flying squirrels (Pteromys), and marmots (Arctonyx), beavers (Castor), dormice (Myoxidae), rats and mice, voles, lemmings, musk-rats (Muridae), pocket-rats (Geomyidae), the capybara (Hydrochoerus), porcupines (Hystricidae), agoutis (Dasyprocta), guinea-pigs (Cavia). Sub-order Duplicitíntata—with two pairs of incisors in the upper jaw, the second pair behind the first, the enamel extending round the teeth, but thinner posteriorly. This sub-order includes only the Pleas or tailless hares (Lagomyys) and the hares and rabbits (Lepus).

See Waterhouse, Natural History of the Mammalia, vol. ii. 'Rodentia' (1848); Flower and Lydekker, Mammals, Living and Extinct (Lond. 1891).

Roderie, 'the last of the Goths,' whose tragic death, coincident with the downfall of the Visigothic monarchy in Spain, has inspired poets and romancers (Scott, Southey, Geibel, Dahn) to throw round him a halo of glory. Next to nothing authentic is known about him; but according to the commonly accepted legend, he was the son of a noble who was blinded by King Witiza. A crisis occurred having brought him into the hated Witiza by the elegance and the nobles of Roman blood, Roderic was elevated to the throne (710). The sons of Witiza, however, bided their time, meanwhile submitting to the usurper. At length certain unavailing plots were engaged in a plot to dethrone Roderic by Count Chandoa, the governor of Cata (in North Africa), whose daughter had been outraged by the Visigothic king. Julian brought over with him a Moorish chief named Tarik at the head of 12,000 men. Roderie met the invading army on the banks of the Guadalete, near Xeres de la Frontera, on 26th July 711. The battle raged six days; but the sons of Witiza, who commanded the wings of the Christian army, deserted during the contest, and the rout of the Visigoths was complete. Roderic either died on the field or was drowned in the Guadalete. On 27th July he attempted to swim his horse across. A third version, however, relates that he escaped and passed the rest of his life as a pious hermit. By this victory the Arabs became masters of southern Spain.

Rodez, a town of southern France (dept. Aveyron), stands on a bold bluff overlooking the Aveyron, 148 miles by rail NW. of Montpellier. The Gothic cathedral (1277–1535) has a tower, 260 feet high, crowned by a colossal image of the Virgin. There are several medieval houses, remains of a Roman amphitheatre, and a restored Roman aqueduct. Cloth-making, tanning, and cattle-dealing are the principal occupations. Pop. (1872) 12,111; (1886) 14,560; (1891) 12,065.

Rodgers, John, American naval officer, was born in Maryland, 11th July 1771, the son of a Scotch colonel of militia. He was a captain in the merchant service by 1789, and in 1798 entered the navy. In 1805 he escorted from Tripoli and from Tunis treaties abolishing blackmail and forbidding the slavery of Christian captives. On 23rd June 1812 he fired with his own hand the first shot in the war with Britain, and during the war he took twenty-three prizes. He died 1st August 1838. — His son, John Rodgers (1812–92), in the navy, captured a Confederate ironclad, and rose to be rear-admiral (1869), and superintendent of the United States naval observatory (1877).

Rodin, Auguste, the foremost of contemporary French sculptors, was born at Paris in 1840, studied under Barye, and began to exhibit in the Salon in 1872. He has produced great sculptural and symbolical groups, but is best known by his portrait busts and statues, notably the bust and the monument of Victor Hugo. See Monmouth in the Portfolio (1887); and Brownell, French Art (1894).

Rodman, Thomas Jeffverson (1815–71), an American soldier, was a designer of a rapid-firing casting cannon. See article CANNON, Vol. II. p. 714.

Rodney, George Brydges Rodney, Lord, English admiral, born 19th February 1719, was the second son of Henry Rodney, a cadet of an ancient Somersetshire family, the Rodney, who had merged in that of Brydges, and was at this time represented by the first Duke of Chandos. Henry Rodney served for a few years as cornet of horse in the wars of William III. and Anne, and afterwards, settling at Walton-on-Thames, obtained an appointment (1743) to the second rate of one of the royal yachts. In this capacity he was noticed by the king, who offered to stand as godfather to his second son. The Duke of Chandos was the other godfather, and after the two the boy
was christened George Brydges. He received his early education at Harrow, which he quitted at the age of twelve to enter the navy as a 'king's letter boy.' After serving chiefly on the Newfoundland station under a lieutenant in 1730, he joined the 7th ship in Mediterranean; in 1742 he was promoted by Admiral Mathews to be post-captain, and was sent home in command of the Plymouth, a 64-gun ship. He afterwards successively commanded the Sheerness, Ludlow Castle, and Centurion, and in 1747 the Surprise, in which he had a brilliant share in Hawke's victory over L'Estéandre on 14th October.

In 1748 Rodney went out in the Rainbow as governor of Newfoundland and commander-in-chief on that station, where he remained till 1752; in 1749 he joined the French convoy, and from 1754 to 1755 the Prince George. He was then appointed to the Dublin, one of the fleet under Sir Edward Hawke in the futile expedition against Rochefort, and in 1758 under Boscawen at the capture of Louisburg. In May 1759 Rodney was promoted to be rear-admiral, and in July commanded the small squadron which bombardaded Havre and destroyed the flotilla of flat-bottomed boats collected for the proposed invasion of England. In October 1761 he was appointed commander-in-chief on the Leeward Islands station, where in the early part of 1762, in co-operation with the land forces, he captured Martinique, St. Domingo, and Grenada. In October he was promoted to be vice-admiral, and returning to England in August 1763 was created a baronet, 21st January 1764. In November 1765 he was appointed governor of Greenwich Hospital, but in 1771, when it was resolved to active service, was promoted to be lieutenant governor, rear-admiral of Great Britain, and sent out as commander-in-chief at Jamaica. He hoped that he might succeed to the office of governor, which became vacant in 1773; but in his command he had shown an independence which was distasteful to Lord Sandwich, and his application was unsuccessful. In 1774 he returned to England, and for the next five years was left on half-pay, in very embarrassing circumstances, which compelled him to retire to France. It was not till October 1779 that he was appointed commander-in-chief at the Leeward Islands, and on 29th December he put to sea with, in addition to the West Indian ships, a powerful squadron and a large convoy of store-ships for the relief of Gibraltar, then besieged by the Spaniards. On 9th January 1780, when brought up abreast of Cadiz, he engaged in a battle with Spanish store-ships under the escort of a 64-gun ship, all of which he captured. Passing Cape St Vincent on the 16th he met the Spanish squadron under Don Juan de Langara, which he attacked with a dash and vigour that carried everything before him. Seven ships out of eleven were taken or destroyed; the others managed to escape into Cadiz. Gibraltar was thus relieved without further difficulty than was caused by the weather; and on 13th February Rodney sailed for the West Indies. He had scarcely reached St Lucia, which he made his headquarters, when he heard intelligence that the French fleet under the Comte de Graslin had put to sea from Martinique. He immediately followed, and, overtaking it on the 17th April fought an action in which, in despite of the fighting instructions, he attempted to concentrate his force on the enemy's rear. His signals were not sufficiently clear, the flag-officers and captains did not understand what was proposed, and the clever attempt resulted in comparative failure. During the following May he again twice met De Graslin, but without being able to bring him to a decisive engagement. In November he was nominated a K.B.; and in January 1781, in obedience to special orders from home, he seized on St Eustatius and the other Dutch settlements; but his health having broken down he was compelled to return to England a few months later. In December 1781 he again sailed for the West Indies; and as before, on arriving at St Lucia he had intelligence of the French fleet, under Comte de Graslin, having sailed, with some 3000 troops on board, for Cape Francois, where it was to join a strong Spanish fleet for an attack on Jamaica. Abreast of Dominica Rodney came: he has an excellent share in the action. In the morning of the 9th April, had the good fortune, on the 12th April 1782, to bring it to close action; and being enabled, by the varying nature of the wind, to pass through the enemy's line, he gained a brilliant victory, rendered still more crushing by the success of a small squadron detached to look out for stragglers in the Mona Passage. The French loss in killed and wounded was extremely severe, and seven of their ships were captured, one of them being the Ville de Paris, with the Comte de Graslin himself on board. The victory placed the English on a very different footing in the negotiations which had been already commenced; and the terms finally agreed on were much more favourable than might otherwise have been expected. But before the news reached England Admiral Pigot had been made Lord Pigot, and as a preliminary to supersede Rodney, who was looked on as a partizan of Lord Sandwich; and though an express was sent to stop Pigot on the way it failed to overtake him. Rodney returned to England, where—though raised to the peerage as Baron Rodney, with a pension of £9000 a year, and as a vote of thanks from the government. He had no further employment, and was allowed to live in comparative obscurity, which his shattered health perhaps rendered necessary. He died in London on 24th May 1792.

See his Life by General G. B. Mundy (2 vols. 1809), and Hanway's Rodney (*Man of Action* series 1801).

Rodostos or Rodigues, a hilly volcanic island (1700 feet), 18 miles long by seven broad, lies 380 miles off the coast of N. of Mauritius, of which it forms a dependency, being one of the Madeiran group. The soil is fertile, and agriculture is the chief occupation. The exports (agricultural produce and fruits) are valued at £6500 annually, the imports at £2100. Hurricanes often cause great damage to the island, which is encircled by a coral-reef. It was discovered by the Portuguese in 1645, and has been a British colony since 1814. The chief port is Port Mathurin. Owing to its isolation this island is particularly interesting to the botanist and the zoologist. Until near the close of the 17th century it was the home of the Sialaioi, or saigoa, an extinct bird. Pop. (1890) 1758. See Leguat's voyage thither (Hakluyt Society, 1803).

Roe (Capreolus capreolus), a small species of deer inhabiting Europe and some parts of western Asia, chiefly in hilly or mountainous regions which are covered with forests or with scattered hedges and heath, often not far from sea. In the higher parts it is found on seaweed-covered mountain tracts, the heath of the stag or red deer. It was once plentiful in Wales and in the hilly parts of England, as well as in the south of Scotland, but is now very rare south of Perthshire. The roe is about 2 feet 3 inches in height at the shoulder. Its weight is about 50 or 60 lb. Its colour is a shining grey-brown in summer, more dull and grizzled in winter; on the under
The carving-knives the has 1876), the inches that the 1831. the situated buck become 1884 the small the the Copenhagen. The See the also his having, often but its apt or the Nature's that chamois. fawns rm ii, furrowed ii, The deer, are somewhat long, peculiar and sea-son. The Ijorn Ijiger hut 65), liecame afterwards 1875), proved Barriers lie came 1849 to 1865, and again from 1874 till his death on 30th November 1879. The vigorous nature of his political warfare earned him the popular nickname of 'Toar em.' His greatest political triumph was the moving of a notion for inquiring into the condition of the army before Sebastopol in January 1855, which he carried by a large majority, causing the fall of the administration of the Earl of Aberdeen. He was appointed chairman of the committee which conducted the inquiry moved for. During the civil war in America he favored the Confederates. He supported Beaconsfield's policy during the Eastern crisis in 1877-78, and in 1879 was called to the Privy-council. He wrote The Church of England (1849), and History of the Whig Ministry of 1830 (1852). See his Life and Letters by Leader (1897).

Roentgen Rays. See RÖNTGEN.

Roermund, an old town in the Dutch province of Limburg, at the junction of the Roer and the Maas (Meesse), 29 miles by rail N. by E. of Maes- tricht. The cathedral (1218) is one of the finest Romanesque churches in the Netherlands. The church of St Christopher contains good paintings by Dutch masters. Principal industries are weaving woollen cloths and cottons and making paper. During the middle ages Roermund was on several occasions besieged and taken; its walls were demolished in 1819. Pop. (1890) 12,639.

Roeskilde, a city on the Danish island of Zealand, is situated at the southern end of the Roeskilde Fjord, about 20 miles by rail W. by S. of Copenhagen. In the middle ages this city, surrounded in 967 by the capital of the kingdom, and the seat of powerful bishops. The cathedral, built in the middle of the 13th century, contains the tombs of most of the kings of Denmark. Here peace was signed between Sweden and Denmark on 8th March 1653. Pop. (1890) 9794.

Roe-stone, a name locally given to those limestone which are formed of small globules like the roe of fishes. It has been translated into the scientific term Oolite (q.v.).

Rogation Days, the Monday, Tuesday, and Wednesday before Ascension-day, so called because on these days the Litany (q.v.) is appointed to be sung or recited by the clergy and people in public procession. The practice of public supplications on occasions of trouble danger or calamity is traceable very early in Christian use; but the fixing of the days before Ascension for the purpose is ascribed to Manerius, Bishop of Vienne, in the middle of the 6th century. In England the usage dates from perhaps the 7th century; after the Reformation the resitation of the Litany upon these days was discontinued; but a memorial of the old processions long survived in the so-called Perambulation of Parishes. See BOUNDS (BEATING OF THE).

Rogier I., count of Sicily, the youngest of the twelve sons of Tancred de Hauteville of Normandy, was born in that duchy in 1031. When twenty-
seven years of age he joined his famous brother Robert Guiscard (q.v.) in South Italy: but at first he seems to have fought against Robert more than he did his brother. At length the latter was reconciled, and Roger helped Robert to complete the conquest of Calabria. In 1060 Roger was invited to Sicily to fight against the Saracens: he took Messina, and settled a garrison there. Everywhere the Normans were welcomed by the Christians of Sicily as their deliverers from the Moslem yoke, and they won town after town, until in 1071 the Saracen capital, Palermo, was captured. Robert then invited Roger with the comptship of Sicily. Count Roger spent the rest of his life, apart from his numerous expeditions undertaken for the support of his brother, in completing the conquest of Sicily, which was finally effected in 1090. Already as early as 1060 Duke Robert had given his brother the half of Calabria, with the title of count. After Robert's death (1085) Roger succeeded to his Italian possessions, and became the head of the Norman power in Southern Europe. Pope Urban II granted him special ecclesiastical privileges, such as the power to appoint to the bishops, and made him papal legate of Sicily (1068). Roger died at Mileto, in Calabria, in June 1101. See Sicily.

Roger II, king of Sicily, the second son of Count Roger I, was born in 1067, and by the death of his elder brother Simon in 1075 became comte of Sicily. On the death of Duke William of Apulia, grandson of Robert Guiscard, his duchy passed to Roger, who thereupon proceeded to weld together a strong Norman kingdom in Sicily and South Italy: the Antipope Anacletus crowned him king of Sicily and Italy in 1097. He married his dominions the Norman principality of Capua (1136), the duchy of Naples, and the territories of the Abruzzi (1140). In the year prior to this last acquisition he managed to take prisoner Pope Innocent II., with whom he concluded an all advantageous bargain. Innocent recognised him as king of Sicily, whilst Roger acknowledged Innocent as pope, gave him his liberty, and held his kingdom as a fief of the holy see. The Byzantine emperor Manuel having insulted Roger's ambassador, Roger's ambassador, George Kallergis, was beheaded. Of Dalmatia and Epirus, took Corfu, and plundered Corinth and Athens (1146). He carried off silk-workers from the Peloponnesus to Sicily, and so introduced that industry into the kingdom. Roger then crossed the Mediterranean (1147) and won a large province from the Saracens, in North Africa—Tripolis, Tunis, and Algeria. His court was one of the most magnificent in Europe; he was tolerant to all the creeds of the various peoples under his rule; his government was firm and enlightened; his name a terror to both Greeks and Moslems. Roger died in February 1154, leaving his throne to his incapable son William. See Sicily.

Roger of Wendover (fl. 1236), Benedictine prior of St Albans, completed the work of Matthew Paris (q.v.).

Essay on Thomas Fuller (1856); Selections from the Correspondence of E. H. Gregson [a memoir of his life] (12 vols. 1859); and The Pilgrim's Progress: A Study of the Symbolism of the Bible, Congregationalist Lectures (1873).

Rogers, James Edwin Thorold, economist, was born at the village of West Moen, Hampshire, in 1823, and educated at King's College, London, and Magdalene Hall, Oxford, graduating with a first-class in 1846. At first an ardent Puseyite, he took orders, but soon returned to Oxford and became a successful 'coach,' and renounced his orders formally, together with Dr Congreve and Leslie Stephen, after the Clerical Disabilities Act of 1870. In 1862 he was elected professor of Political Economy, but made so many enemies by his outspoken zeal that he was chosen elected in 1868, nor until the death of Bonamy Price in 1888. An advanced Liberal in politics, he represented Southwark, 1880-83, and Bermondsey, 1885-86. He died October 12, 1890. His greatest work is his painful and lab6rrous History of Agriculture and Prices in England (6 vols. 1866-88), and its abridgment, Six Centuries of Work and Wages (1885). Besides these he wrote a study on Cobden (1873), edited the Speeches (1868) and Public Addresses of Bright (1870), the Wealth of Nations (2 vols. 1889), and the Collection of Proverbs (1624-1674).

Other books are Education in Oxford (1861); Historical Glances (2 series, 1869-70); The First Nine Years of the Bank of England (1857); The Economic Interpretation of History (1888); and, ed. by his son, The Industrial and Commercial History of England (1892).

Rogers, John, the first of the Marian martyrs, was born near Birmingham in 1565, graduated in 1587. He carried off his brother, a London rector (1592-34), and then lived for some years abroad, at Antwerp and Wittenberg, where he embraced the Reformed doctrines. He prepared a revised translation of the Bible (q.v., p. 127), which was published as 'Matthew's Bible' in 1557, and, returning to England in 1548, preached at St. Paul's Cross in 1553, just after Queen Mary's accession, against Romanism. After a long imprisonment he was tried as a heretic, and burned at Smithfield on 4th February 1555. See his Life by Colonel J. L. Chester (1861).

Rogers, Samuel, the poet, was born at the suburban village of Stoke-Newington on 30th July 1763, the second son in a family of nine, of a father, a City banker, and a mother, a Whig and dandy, a member of the congregation of Dr Price (q.v.); his mother, Mary Radford, was the great-granddaughter of Philip Henry. After a private education, at sixteen or seventeen he entered the bank, in 1784 was taken into partnership, and on his father's death in 1798 became head of the firm. His taste for literature and for the company of literary men awoke at an early period, and one day with a friend he had gone to call upon Dr Johnson at his house in Bolt Court, but his courage failed him when his hand was on the knock. In 1781 he contributed eight short essays to the Gentleman's Magazine; next year wrote a comic opera, containing a score of songs; and in 1786 (the year of Burns's first volume) published An Ode to Superbition, with some other Poems. In 1792 appeared The Pleasures of Memory; a Musical Entertainment, consisting of an Ode, and a dozen stanzas on Memory, which were turned into music by Thomas Arne. In 1795 he published The World of Appearance; in 1797 The Life and Death of Jephtha (1728-29). The last, in blank verse, proved a monetary failure; but the loss was recouped by the splendid edition of it and his earlier poems,

Other books were a Life of John Howe (1836); The Eclipse of Faith (1852), an admirable piece of argument, and its Defence (1854), in reply to P. W. Newman.
ROGEL

brought out at a cost of £1,500 (2 vols., 1830-34), with 114 illustrations by Turner and Stothard.

Meanwhile he had left the old home on Newington Green, and in 1803 (in which year, with £5000 a year, he withdrew from the bank as a sleeping partner) had given up the chambers in the Temple, and taken down the criminal cases in his house and his princely house, 22 St James’s Place, looking into the Green Park. He had had his affairs of the heart, had proposed, indeed, to a daughter of Banks the sculptor. She refused him, and left him free to cultivate his muse and cannie wit, to raise land, music, and in 1812 was abolished the life of litigation. She was taken by the Bank at home and on the Continent, and to gather an art-collection which sold at his death for £50,000. With Rogers one cannot help harping upon money, for he was rich as no poet perhaps before or after him. At least he made a good use of his riches, for he was quietly generous to Moore and Campbell, and others, unknown ones, whom it was no such credit to have aided. But with the kindest heart he had the unkindest tongue. ‘I have a very weak voice,’ he explained once to Sir Henry Tayler; ‘if I did not now put my foot on my own words I would have the whole country.’ With which, however, Campbell’s saying should be coupled: ‘Borrow five hundred pounds of Rogers, and he will never say a word against you till you want to repay him.’ Anyhow it has come to pass that ‘melodious Rogers,’ who ranked above Shakespeare and Coleridge, as we too might rank him if only his works had perished, is better remembered to-day by a few of those ill-natured things (e.g. by his witty composure upon Ward; see Epicure) than by his poetry, which, chaste though it be, and elegant and cultured, with ‘no such jailer as a vulgar line in it,’ is dead and mummified. It is no more a pleasure of memory, but unread, not even forgotten. One is reconciled somewhat to such oblivion by remembering how, when in his old age Fanny Kemble used to go and sit with Rogers, she never asked what she should read to him without his putting into her hands his own poems, which always lay by him on his table. For this was the Rogers who had announced his intention of being ‘read to, when old and beliridden, by young poets—or perhaps.’ There is not much more to tell of him—the bank-robbery (£47,000, 1844); the proffer by Prince Albert of the laureate

See Alexander Dyce’s Recollections of the Table-talk of Samuel Rogers (1856); Recollections by Rogers, edited by his nephew William Sharpe (1860); Hayward’s article in the Edinburgh Review for July 1829 (reprinted in his Essays, 1879); and, especially, P. W. Claden’s Early Life of Rogers (1887), and Rogers and his Contemporaries (2 vols. 1890).

ROGET, Peter Mark, was born in London in 1790, the only son of a Genevan who had settled as minister of a French church in London and married the daughter of Dr. Thomas Dyer, the most learned of the Edinburgh, became physician to the Manchester Infirmary in 1804, and in 1808 settled in London, where he became physician to the Northern Dispensary; F.R.S. (1815), and afterwards for nearly twenty years professor of physiology at the Royal Institution; and an original member of senate of the University of London, surviving till September 17, 1860. He wrote one of the 'Brotherhood Treatises,' On Animal and Vegetable Physiology considered with Reference to Agriculture (1824), The Elements of Physiology (1825), and The Elements of Anatomy (1826); and was the author of the famous Thesaurus of English Words and Phrases (1852), passed through 28 editions in his lifetime.

ROGHE-MONEY, an assessment formerly levied on every county in Scotland 'for defraying the charges of apprehending criminals, or subsisting them when apprehended, and of carrying on prosecution against them.' This tax was first imposed by statute, 11 Geo. I. cap. 26, on the narrative of bank-robbery, and the apprehension and escaping punishment for lack of the funds necessary to bring them to justice. The freeholders in each shire were directed to fix the assessment at any of the head courts yearly, and to appoint collectors. By 31 and 32 Vict. chap. 82 rogue-money in the shires was transferred to the local county councils. The Local Government (Scotland) Act, 52 and 53 Vict. chap. 50, sect. 11, this power of the Commissioners of Supply is now vested in the locally elected county councils. It is to be observed, however, that the repealed portions of 31 and 32 Vict. chap. 82 do not include sect. 10, which reserves the existing right of any burghe to levy rogue-money.

Rohan, an ancient Breton family of princely rank, descended in the male line from the dukes of Brittany, the House of Rohan count of Montferrat, which existed in the department of Morbihan. Its motto was characteristic of its pride: 'Roy ne pus, Duc ne daygne, Rohan says.' The family still flourishes in the line of Rohan-Guemene-Rochefort, naturalised with princely rank in Austria. The line of Rohan-Sombise became extinct in 1787, that of Rohan-Gié in 1638. The founder of the family was Alain I., fourth son of the Vicomte Eudon de Parné, who became Vicomte de Rohan in 1128. Under Charles IX. in 1570 the domain of Guemene was formed into a principality for Louis Rohan VI., whose son Louis became prince of Rohan-Guémené. The family was raised to the peerage in 1558 by Henry III. Due de Montbazan. Both the latter and his son Hercule (died 1654) bore arms against the League. The famous beauty, wit, and political intriguer, the Duchesse de Chevremuse (died 1670), was a daughter of Hercule. Louis, Prince de Rohan-Guémene (born 1633), lost the favour of Louis XIV. by his dissolute life, and died on the scaffold in 1674 for treasonable dealings with the Dutch.

Louis René Edouard, Prince de Rohan-Guémene, born 25th September 1735, embraced the clerical life in spite of dissolute morals and an extravagant love of luxury, and at an early age became coadjutor to his uncle the Bishop of Strasbourg. In 1772 he was sent as a special minister to Vienna. He spent three years there, and he ruined himself at the French court by slanderous gossip about Marie Antoinette. He was recalled in 1774, and, although with grudging, made grand-almoiner in 1777. Next year came a cardinal's last, through the influence of Stanislas Poniatowski, king of Poland; and a year later the succession to the bishopric of Strasbourg, held by three members of his family before him. His eagerness to recover his footing at court made him an easy victim to the schemes of Cagliostro and the adventurer Lamotte, and their clumsy forgeries and personages were powerful enough to make him pur- chase the famous Diamond Necklace for the queen. As soon as the plot was discovered the cardinal was sent to the Bastille, but was acquitted by the Parlement of Paris, 31st May 1786. He found himself in deep disgrace, but the king of France was elected to the States-general in 1789, but refused to take the new oath to the constitution in January 1791, and retired to Ettenheim in the German part of his diocese, where he died, 17th February 1803.

See DIAMOND NECKLACE, and books enumerated thereat; also a little narrative in Edma, par M. Louis de la Condamine, du Comte de Lamarre-Valeix (edited by Louis Lacour, 1858), and G. C. D'est Ango, Marie Antoinette et le
Rohilkhand, a division of the North-western Provinces of India, lying west of Oudh, has an area of 10,908 sq. m. and a pop. (1891) of 5,345,674.

Rohillas were Afghan Pathans who rose to power in Rohilkhand, India, about the middle of the 18th century. The Maharattas on one side and the Sikhs on the other pressed them hard; at last the Sikhs, with the help of British soldiers, put them down, and established the Ahom dynasty (1773-1791) in subduing them. See Sir John Strachey's "Hastings and the Rohilla War" (Oxford, 1892).

Rohlfis, Gerhard, German traveller in Africa, was born at Vegesack near Bremen on 14th April 1852, studied medicine at Heidelberg, Würzburg, and Göttingen, and joined (1855) the Foreign Legion service on an expedition to Algeria, and made himself thoroughly familiar with Mohammedan customs, he set off (1861) for Morocco, travelled through that country under the protection of the Grand Sherif, and was exploring the Wady Draa in the Sahara (1862) when he was attacked by his own guides, plundered, and left for dead in the desert. Two marabouts found him and carried him back to Algeria. In 1864 he again visited the Sahara, getting to Tuat and Ghadames; in 1865 he was in Fezzan and Tébésit; in 1866 in Bornu, whence he made for the Benue, and so reached the British expedition to Abyssinia in 1865; and was then sent to carry presents from the king of Prussia to the sultan of Bornu. In 1873-74 he was commissioned by the khalife of Egypt to lead an expedition to the oasis of Sirah (Jupiter Ammon) in the Libyan desert, as the basis of all original research in 1878 sent him to carry presents from the emperor to the sultan of Wadai; but the expedition was attacked and driven back by Arabs in the oasis of Kuira. The last public mission of Rohlfis was to take a letter from the German emperor to the king of Abyssinia, and early every one of his journeys is described in a separate book—e.g. Reise durch Marokko (4th ed. 1881); Reise durch Nord-Afrika in 1865-67 (1868 and 1873), in Petermanns Mitteilungen; Land und Volk in Afrika (1870); Queer durch Afrika (1874); and some other. He died at Gottingen 24 June 1896.

Rohrbach, a town of British India, in the Punjab, 42 miles NW. of Delhi. Turbins are manufactured. Pop. 15,699.—The district has an area of 1,797 sq. m. and a pop. (1891) of 590,475.

Rokitansky, Karl, Baron von, founder of the school of pathological anatomy at Vienna, was born at Königgrätz in Bohemia on 19th February 1804, studied medicine at Prague and Vienna, in 1828 was appointed assistant to the professor of Pathological Anatomy in the university of the latter city, and in 1834 succeeded him. He likewise held the offices of prosecutor at the city infirmary, legal executive to the city, and professor of the ministry of education and public worship. In 1869 he was made president of the Austrian Academy of Sciences. He retired from work in 1875, and died on 23d July 1875. Although Rokitansky agreed with the old humoral pathologists in thinking that he regarded the violence of the blood as the chief immediate cause of disease, he laid the principal stress of medical study upon morbid anatomy, post-mortem dissection, and observation. He stands pre-eminent amongst German medical teachers as the one who established pathological anatomy as a definite scientific inquiry in the domain of medicine. His teachings were published in the great work Handbuch der pathologischen Anatomie (5 vols. 1842-46; 3d ed. 1855-61; Eng. trans. of Sydenham Society, 4 vols. 1849-52), and in Memorials of the Vienna Academy of Sciences. See an anonymous Biography (Vienna, 1874).

Rokitno, a vast swampy region, now being gradually drained, between the rivers Priep, Dnieper, and Beresina in West Russia. This region is regarded by Pöseke as the original home of the Aryans, whence proceeded the lake-dwellers of Switzerland and the Po valley. See ARYAN RACE.

Roland (Ital. Orlando, Span. Rodom), the name of the most prominent hero in the Charlemagne legend. Unlike most legendary heroes,
Roland is a figure in history as well as in poetry and fable, though it cannot be said that the place he occupies as a historical personage is an imposing one. All that we know of him is contained in one line of Eginhard's Vita Karoli, chap. ix., and that simply records his name, Hron الماض, his rank of prefect or warden of the marches of Brittany, and his death on the hills of the Gascogne as a victim of the Pyrenean Sues. Such is the accoum from which a whole forest of romance has sprung up. According to the Annals (commonly attributed to Eginhard, but by some to Angilbert, who died fifteen years before they end), Charlemagne was at his death on the Pyrenees, and he spoke an embassy proposing an alliance and friendship, and that peace was concluded between them. At any rate it is certain that Charles made but a short stay in Spain, that on his way back he levelled the walls of acastle and made a present of it to his son, and that at a distance of 25 miles north-east of it the rearguard of his army was annihilated by the Gascogne. "Roscilla Vallis," the common etymology of Roussevalles, the scene of the disaster, is, of course, like all such etymologies, nonsense. In its oldest known form the name means "the naked height," but there can be no doubt that it is Basque. Whatever may be the true reading of the first syllable, the last two are clearly a corruption of zabal or zavet, a word which enters into the composition of perhaps a hundred place-names in Navarre and the Basque provinces, always indicating a flat, level space, which exactly describes the battlefield. It is a small oval plain, evidently an old lake-bed, shut in all round, except on the south where the waters escaped, by steep mountain-ridges clothed from base to summit with thick beech woods, and the noble forest where, by the Col of Ibiñeta, a path crosses the crest of the Pyrenees and descends the Val Carlos to St Jean-Pied-de-Port. The features of the spot, and the facts of the catastrophe, no doubt, also, are faithfully given in a few words by Eginhard, who in "the briefest manner that he could have written" he placed the scene of the battle, and then heard them spoken of by Charlemagne's old soldiers. As the army, by reason of the narrowness of the place, was marching in extended order, the Gascogne, who, profiting by the denseness of the woods that about there, had posted themselves in ambush on the heights, rushing upon those guarding the rear, hurled them into the valley beneath, and there slew them to a man; and having seized the baggage, dispersed under cover of the night in all directions, so that there was no finding them to take vengeance upon them, Roussevalles is in fact a natural trap and a trap that Charles as a general should have ventured into without first securing the heights and securing the woods; for when Roland, in the Chanson, thinks of it, it is too late. He was in a hostile country, made so by his own acts. It could not be otherwise. In the sight of his face — that he was compelled by military necessity to invade Navarre, that resistance forced him to take Pamplona, that levelling its walls, though it looked awkwardly like spite, was a precaution in view of a future campaign and that, in short, he 'sinned against the mercy of heaven' — But this, as Major Dalgetty observes, "excites no benevolence..."
would naturally from time to time introduce new ones for the sake of novelty or as connecting links, and thus a recognised sequence would be established, which, as minstrelsy became more and more of an art, the jongleurs more like troubadours, and their hearers more cultured and critical, would in course of time grow into a continuous lay. By some such process as this, in all probability, the Chanson de Roland, unquestionably the oldest and best of the chansons de geste, was produced.

The oldest form in which we have it is that of the MS. in the Bodleian Library, Oxford, written presumably towards the end of the 12th century; but the MS. is not a poem, though it is copied by the hand of a scribe and printed as a consecutive poem. M. Gautier, who loves precision, places his composition between the Norman Conquest and the first Crusade, but it is impossible to fix precisely the date at which it ceased to be a mere congeries of songs and became a chanson de geste; at any rate the two references to England as one of Charlemagne's many conquests cannot be relied upon. Nor do the allusions to Mont Saint-Michel justify the assertion that it is certainly the work of a Norman. It is of course in the language of the northern half of France, the language of a troubadour. No good reason for assigning it to any one province. An interesting reference to the country of the poem is spoiled by M. Gautier. The death of Roland, we are told, was prosaged in France by storms and earthquakes from Saint-Michel to Seinz, from Besançon to Wissant. It is not certain whether the place is Seinz or Saintonge. M. Francisco-Michel suggests Senlis; a 13th-century MS. reads Rainns (Reims); M. Gautier boldly proposes the 'saints of Cologne'—i.e., the relics preserved there. Far more probably, as a glance at the map will show, the place intended is Saintonge, the old capital of the Santones and of Saintonge, a town that makes a considerable figure in the middle ages and in the Charlemagne legend. With the other three places mentioned it forms a quadrangle which exactly represents the region within which the Lydie d’oil was dominant. Seinz of the line from Saintes to Besançon was the country of the langue d’oc, the Provencal; west of the line from Mont Saint-Michel to Saintes was the Breton; east of the line from Besançon to Wissant, near Calais, the language was Teutonic. This was not the case as long as it was regarded as synonymous with a North Rhine front, as M. Gautier imagines, but of the habitat of his hearers, the country where his words would be understood. The best, and most likely, the oldest part of the poem is that which deals with the combat at Roncesvalles, Roland's refusal, until too late, to sound his horn, the deeds and deaths of the peers one by one, and of Roland last of all. The opening portion, the despatch of Ganelon at Roland's suggestion as envoy to the Saracens, his anger and betrayal of Roland in revenge, and the concluding part, the vengeance of Charlemagne, and the trial and death of Ganelon, are of the same date. There can be little doubt that the episode of the Emil Baligrant was a comparatively late addition.

Besides the Oxford MS., there are half-a-dozen others ranging from the 13th to the 16th century. The differences between the earlier and later are far too slight to be the basis of the theory, so generally advanced, that one of the little pocket copies carried by the jongleurs, the assonant rhyme (that which disregards the consonants and depends on the accented vowel) is maintained throughout, the same assonance being kept up to the end of each break or paragraph. In this MS. the consonant rhyme, and the poem expanded to twice or thrice its former length. The first shape is the poem as sung; the second as adapted for readers when the minstrel was no longer the sole vehicle for poetry and reading was beginning a common accomplishment. A very close German version, the Rolandlied List, shows that early in the 12th century the chanson had passed out of its native country and language; and it is almost as closely followed in the Icelandic Kariolagniaga Saga of the 13th. The Chanson de Roland is the foundation of the Charlemagne legend, Charles's wars and quarrels with his vassals would no doubt have themselves furnished themes for the jongleurs, but the legend, culminating in the Morgante of Pulei and the Orlandes of Boiardo and Ariosto, is the outcome of the story of Roland and Roncevalles.

The following are the printed editions of the Chanson de Roland: From the Oxford MS., by Franciscus de Sanctis (Paris, 1837); Text, with translation, by F. Genin (Paris, 1859); the Oxford text, ed. by Professor Müller (Göttingen, 1861: reprinted with additions, 1863, 1878); 2d ed. of M. Beuninckx (Brussels, 1867); Text of 18th Nat. added (Paris, 1867): Renexoss, Oxford text, E. Boehmer (Halle, 1872); MS. of Lib. of St Mark, Venice, fac-simile by E. Kolding (Heibronn, 1877); Oxford MS., ed. by E. Stengel, with a photograph fac-simile (Heibronn, 1878); Text, with translation in assont rhyme, Petit de Jullienville (Paris, 1878); Text, with translation, commentary, notes, &c., by Léon Gautier (16th ed. 1887). There are a number of other translations of the poem, by J. Albin, and Juberdt. By far the best is the Baron d’Avril (Paris, 1855, 1866, 1877). The Rolandlied List was printed in 1727, and again by W. Grimm in 1858, and by J. Brecht (1841), and then by C. Hertz (1861). Mrs. Marsh in 1854 translated Vitet's epitome of the poem, and Mr John O'Hagan has given an accurate, scholarly, and spirited version from the original (2d ed. 1886). There is also an English translation by L. Rabillon (New York, 1885).

Roland de la Platière, Jean Marie, and his greater wife, Madame Roland (née Marie-Jeanne) are the most illustrious and memorable martyrs of the French Revolution. Roland was born of a decayed legal family at Villefranche near Lyons in 1754. He made his way unaided, and had risen to be inspector of manufacturers at Amiens, where in the close of 1775 he made the acquaintance of his gifted wife. She was twenty years his junior, having been born at Paris, 18th March 1754, daughter of an engraver, who had ruined himself by unlucky speculations. From the first an eager and imaginative child, she read everything, even heraldry, and Plutarch made her, for instance, to-day's Rolande, a republican for life. At eleven she went for a year into a convent to prepare for her first communion, next passed a year with her grandmother, and then returned to her father's house, where she read Buffon, Bossuet, and Helvétius, and at length found her gospel in the writings of Rousseau. Like admiring mother she lived in 1775, and the girl, solitary and poor, untouched in heart by her many admirers, and sourd to her father by his misconduct, at length in February 1780 married the estimable Roland. He was over forty, thin, yellowish, careless in dress, abrupt and austere in manner, to which a platoon as it came his way was at once dry, unsympathetic, and addicted to talking about himself. But she buried the latent passions of her heart, and for ten years under herself an admirable wife and mother, with perfect domestic simplicity. They lived at Amiens, where her only child, Jacob, was born, which was killed next to Lyons, and travelled in England and Switzerland. The Agricultural Society of Lyons charged Roland to draw up its cahier for the States General, and in February 1791 he went to Paris to watch the interests of his municipality, returned to Lyons in May, and was carried into the town in a coffin at the close of the year. It was now that Madame Roland's masculine intellect and woman's heart made her the queen of a coterie of young and eloquent enthusiasts that included all the famous and ill-fated leaders of the Girondine, Brissot, Buzot,
ROLAND

ROLLEF

Pétion, and at first even Robespierre and Danton. Her noble beauty, dark expressive eyes, sweet voice, and eloquent words added a charm to patriots that was renowned. In March 1792, Roland became minister of the Interior, and his still manners, round hat, and unbuttoned shoes struck dismay into the court. Three months later he was dismissed for his loyal remonstrance to the king, who had refused to sanction the decree for the death of the king's brother. Madame Roland's vigorous pen that wrote this letter, as indeed she wrote most of the papers that her husband signed. He was recalled after the king's removal to the Temple, made himself hateful to the Jacobins by his protests against the September massacres, and took his part in the last ineffectual struggle of the Girondists to form a moderate party.

It was in the last days of the Girondists that the reciprocal affection between Madame Roland and Buzot crossed the indefinite bounds that separate friendship from love. The two Maistre's three books still are, to one touch of softness that her nature needed, says Sainte-Beuve, to make it wholly feminine and French. But her Spartan soul sacrificed its passion to duty, and strong in the purity of her heart she made a confidant of her husband, partly perhaps because she felt an urge to sacrifice herself, but doubtless still more because the ideal love to that exalted virginial love was a love nourished upon sacrifices, that encircles its object with an aureole of respect, and dreads to find in possession the end of its enchantment. The struggle brought on six days of physical exhaustion, and in the seventh the sound of the tocsin announced the proscription of the Twenty-two (31st May). Roland had been arrested, but escaped and fled to Rouen; Buzot and some of the others fled to Caen to organise an insurrection, but in vain; the 4th July she herself was carried to the Abbaye. Sot at liberty two days later, she was arrested anew and taken to Sainte-Pélagie. She had five more months of prison before death closed her tragedy of life, and during this time she wrote her unfinished Mémoires, a study of her text, and on the 1st November, the execution of the Twenty-two, she was transferred to the Conciergerie for her own safety. She was taken to the Tribunal dressed in all white, her long black hair hanging down to the girdle, and in the dusk of the 8th November 1793 she was carried to the guillotine along with a trembling printer of assignats, whom she asked Sanson to take first to save her the horror of seeing her head fall.—‘You cannot,’ said she, ‘refuse the last request of a woman.’ It is usually told how, on the point of entering the awful shadows of eternity, she asked for pen and paper to write down the strange thoughts that were rising within her, but Sainte-

Beuve thinks it impossible, puerile, untrue to the nature of the heroine, as well as unauthenticated by good contemporary evidence. As she looked up at the statue of Liberty, she exclaimed, ‘O Liberté, comme on t’a jouée!’ or as it is still more commonly given, ‘O Liberté, que de crimes on commet en ton nom!’ She had often said her husband would not long survive her; a week later he ran himself through with his sword-stick near Rouen, November 15, 1793.

Madame Roland’s Mémoires reflects little of the horrors amid which it was written, but is a serene and delightful revelation of her youth in a series of charming glimpses. But in writing she is best and most natural in her letters, as in the series to Bose, those to Bérald des Issarts, the four to Buzot, and the exquisitely simple letters to her two school friends, Henriette and Sophie Cunet. The best editions of the Mémoires, for the first time printed in their entirety, are those of Dauban (1864) and Faugère (1864). Her Letters were collected by Dauban (2 vols. 1867). See the studies by Dauban (1894), Mathilde Blind (1860), and Idna M. Tarbell (1886); Launy, Deux Femmes Cultivées (1884); and Austin Dobson, Four Frenchwomen (1880); Sainte-Beuve, in Nouveaux Lumières, and in Portraits de Femmes; Schérer, in his Etudes.

Rolf, see Northmen, Normandy.

Rolle, Richard. See Hampole.

Roller (Coracias), a family of Picarian birds characteristic of the Ethiopian and Oriental regions, although the common Roller is extensively distributed in the Palaearctic region and a few species enter the Australian region. None are found in the New World. Malagascus possesses three species peculiar to itself, and so different from one another that they are regarded as types of different genera, and so different from other rollers that they are grouped into a separate sub-family, Brachypteracianae: they are named ground-rollers, and are nocturnal in habitat. An Indian species, Eurytoma orientalis, is also nocturnal. The Common Roller (Coracias garrula) is an autumn or more rarely a spring visitor to the British Isles; and about one hundred have been recorded since the first one was noticed by Sir Thomas Browne in 1644. Some have visited the Orkneys and Shetlands. One has been found as far west as St Kilda, and about half a dozen have been recorded from Ireland. It is a stranger to northern Europe; in central Europe it is common; in countries bordering on the Mediterranean it is very abundant. It ranges through Asia to Omsk in Siberia and to north-west India. In winter it extends its migrations to Natal and Cape Colony. In size it is about a foot long. The general colour is light bluish green; the mantle is chestnut-brown; the wings and rump are adorned with beautiful azure blue. The female resembles the male in plumage. Nesting takes place in the

The Common Roller (Coracias garrula).
woody haunts in May. The nest, which is made in a hollow tree or wall, is built of a few chips, or of roots, grass, feathers, and hair, according to circumstances. The eggs are five or six in number and are of a closey white colour. The food consists of insects and other small creatures on the ground.

The name 'Roller' is given to the bird on account of its varied and unsteady flight and the habit the male has, during the breeding season, of indulging in extraordinary tumbling antics, and turning somersaults in the air.

Rolleston, George, was born at Malthy in Yorkshire on July 29, 1829. He had his schooling at Gainsborough and Sheffield, next entered Pembroke College, Oxford, took a classical first-class in 1850, and was elected fellow of his college the next year. He studied at St Bartholomew's Hospital, and was appointed in 1855 a physician to the British Civil Hospital at Smyrna. Returning to England in 1857, he was made physician to the Radcliffe Infirmary at Oxford, and somewhat later Lee's reader in Anatomy. In 1860 he was appointed Linacre professor of Anatomy and Physiology, became F.R.S. in 1862, Fellow of Merton College in 1861, and was elected a fellow of the university of Oxford in 1864. In 1869 he was appointed condescendent to the principal of the College of Beauvais, but was ejected from this situation twelve years later owing to his Jansenistic sympathies. He was re-elected rector of the university in 1790, and died September 14, 1741. His Histoire des Études (4 vols. 1726-31) has been pronounced by Villeneau 'a monument of good sense and taste;' his Histoire Ancienne (13 vols. 1730-38), long popular and much translated, is feeble in its philosophy, jejune in its criticism, and often inaccurate; yet it has furnished the subject of ancient history to many men since the young prince Frederick the Great. His Histoire Romaine (16 vols. 1738-48) was a much inferior work, long since deservedly forgotten.

Rollein, Ludru. See LEdru-Rollin.

Rollo. See Northtwen, Normandy.

Rolls, Master of the, was formerly the chief of the twelve Masters in Chancery, entrusted with the care of grants passed under the great seal, and of all the records of the Chancery; he also sat on the equity side of the court as an independent though subordinate judge; doubts having been raised as to his jurisdiction, his powers were confirmed by act of parliament in 1570. The official residence of the Master of the Rolls was excluded from the House of Commons; he has since been transferred, by an act passed in 1881, to the Court of Appeal, but he continues to perform administrative duties as head of the Record Office. For the Rolls Series, see Records.

Roman Architecture. The Church (q.v.), and comprising the delegations of Bologna, Ravenna, Ferrara, and Forli. These delegations became in 1861 distinct provinces of the kingdom of Italy.

Romaic, a term for the popular Greek dialect developed before the fall of Athens. Romaic was essentially different from the modern Greek tongue as now spoken. The first who wrote in this popular tongue is believed to have been a monk Prodomus in the 12th century. Those who clung to the old Attic which still maintained an artificial existence called themselves Hellesos; the Romaic, which were called Romaicos, from Nea Romei ("new Rome"), the new name for the capital of the eastern empire. See Greece, Vol. V. p. 392.

Romaine, William, evangelical divine, was born at Hartlepool, Durham, September 25, 1714, and was educated at Hartford College and Christ Church, Oxford. He held curacies at Lew Trenchard, Devon, Burstead and Horton, Middlesex; was lecturer of St George's, Botolph Lane, and St Botolph's, Billingsgate, and of St Dunstan-in-the-West from 1744 till his death. He was also assistant morning preacher at St George's, Hanover Square, 1750-55; curator and morning preacher at St Olave's, Southwark, 1756-69; and morning preacher at St Bartholomew the Great, Smithfield, 1759. In 1764 he was chosen rector of St Andrew Wardrobe and St Ann's, Blackfriars, and though the election was disputed it was confirmed by the Court of Chancery in 1766, and he held the living till his death, July 26, 1786. Romaine was a bulk of Evangelicalism in his day, though himself infected with the taint of Hutchinsonianism. He assailed, not without credit, Warburton's Divine Legation of Moses; published commentaries, many sermons, and three books of edification that enjoyed for their simulations a remarkable popularity: The Life of Faith (1763), The Walk of Faith (1771), and The Triumph of Faith (1784). There is a complete edition of his works, with Life by the Hon. and Rev. W. B. Calogan (8 vols. 1796).

Roman Architecture. Of the early architecture of Rome and the other Latin cities comparatively little is known, but the early Roman architecture consist of a few arches and sepulchral monuments. With the conquest of Carthage, Greece, and Egypt the Romans became acquainted with the arts of those countries, and by degrees endeavoured to use them for the embellishment of the imperial city. Besides, Rome under the empire was the capital of the world, and attracted artists from every country. The result was that the architecture of Rome became a mixed style. It was largely imported, and partook of the character of the importers. The great interest of Roman architecture is that it is a mixture and amalgamation of ancient styles, and the starting-point for modern styles. It is thus the connecting-link between ancient and modern art; the whole history of Roman architecture being that of a transition, slow but steady, from the external architecture of the Greek temple to the internal architecture of the basilica. Rome borrowed from Greece the oblong peristyle temple, with its horizontal construction and decoration, and the various 'orders.' See COLUMN, GREEK ARCHITECTURE. From the Etruscans probably were derived the circular form of temple and the semicircular arch, with the other leading features in the development of the future Roman style. The peripteral form of the Greek temple, however, was seldom followed by the Romans, who preferred to adhere to the early Italian form of columns attached to the walls of the cela.

The Orders imported from Greece were the Doric,
Ionic, and Corinthian. These were all used in Rome, but with some modifications; the Doric, for example, being never employed as in Greece, being without fluting, and having the capital and entablature altered, and a base added, so as to make the style more similar to the others, with

which it was often associated. The Ionic had the volutes turned out angularwise, so as to present a similar face in each direction. The favourite 'order' of the Romans, however, was the Corinthian. It was invented in Greece, but more fully developed in Rome, where it suited the desire which existed for richness and luxuriance in architecture. Many fine examples of this style exist in Rome (as the Pantheon and the temple of Jupiter Stator) and in the provinces (as the Maison Carrée at Nîmes and the Great Temple at Baalbek), the capitals, wherever found, being designed in endless variety. The Composite order was an invention of the Romans, and is sometimes called the Roman order. It is a combination of the Ionic and Corinthian. All these orders were employed by the Romans, but in a manner peculiar to themselves; they combined with the Greek orders the arch. This feature, at first confined to substructures, was gradually introduced into the visible parts of the structure, and became finally an important element in the elevations. The columns were placed (fig. 1) at wide intervals, and set on pedestals to give them and the entablature a proper proportion; whilst behind the columns square piers were intro-duced, and from them arches were thrown which supported the wall. This was the favourite style of the Romans, and may be seen in all their important works (amphitheatres, arches, baths, &c.). They piled one order above another, marking each story with the entablature. As the style proceeded vaulting and arching became more common, especially in internal construction, but the horizontal ornamentation was never entirely abandoned. Arches of the above construction were thrown from pillar to pillar behind the entablature, but gradually the pier was omitted, and the arch openly constructed from column to column, the architrave bent round it, and the cornice continued horizontally above, as at Diocletian's palace at Spalato.

The buildings executed by the Romans are very varied in their character, but the same style was used for temples, baths, amphitheatres, triumphal arches, tombs, &c. The earliest temples of which remain exist are those of Jupiter Stator in the Forum, Jupiter Tomans, and Mars Ultor, all of the Augustan epoch, and each with only three columns left. These are supposed to have been nearly peripteral, and it is worthy of notice that the cells are all large, and one of them has an apse.

One of the most interesting temples of Rome is the Pantheon. The portico is of the age of Augustus, but the rotunda is probably considerably later. The dome of the interior is a splendid example of the progress of Roman architecture in developing the use of the arch, and transferring the decoration from the exterior to the interior. The former is in this case totally sacrificed to the latter; but the interior has not yet been surmounted for boldness of construction or simplicity and sublimity of effect (see Pantheon). Other examples of circular temples, on a small scale, are found at Tivoli and in Rome, both dedicated to Vesta.

The greatest works of the Romans, however, were not their temples. The Basilicas (q.v.), Amphitheatres (q.v.), and Baths (q.v.) are far more numerous and more stupendous as works of art, and all show how well the Romans had succeeded in producing an internal architecture, which at a later period became so useful as a model for Christian buildings. The Basilica of Trajan is a type of the Christian wooden-roofed churches; while that of Maxentius (fig. 3), with its great intersecting vaults, and its vaulted aisles and buttresses, contains the germs of the greatest Christian cathedrals. The Roman amphitheatres have never been surpassed for size and grandeur, or for suitability to their purpose. And of the baths sufficient remains still exist, although much decayed, from the perishable nature of the brick and stucco employed in their construction, to prove that the scarcely credible descriptions of contemporaries were surpassed by the grandeur of the buildings themselves. Other
VARIED public works are their many aqueducts and bridges, triumphal arches, pillars of victory, and tombs. See AQUEDUCT, and ARCH (TRIUMPHAL). Of the tombs of the Romans the earliest and best specimen is that of Cecilia Metella (wife of Crassus) on the Appian Way (fig. 4). It consists (like most Roman tombs) of a round drum placed on a square basement, and was probably surmounted by a conical roof. The tomb of Augustus was similar, on a very large scale, and the sloping roof was broken into terraces planted with trees. That of Adrian (now the castle of St. Angelo in Rome) is another enormous example. The tombs were generally ranged along the ways leading to the gates of cities.

The later tombs of Rome are well worthy of study, as they contain many specimens of the transition towards the Christian style. They are generally vaulted, frequently with domes, as, for instance, the tombs of St. Helena and Sts. Costanzo, Fergusson also places the so-called 'Temple of Minerva Medica' (fig. 5) amongst the tombs. It is a beautifully arranged building with ten sides, all containing deep niches (except the side with the door), surmounted by a clerestory, with ten well-proportioned windows. The vault is polygonal inside and outside; and the pendentives, ribs, buttresses, &c., which played so important a part in the Christian architecture both of the East and West, are distinctly used in its construction.

Of the domestic architecture of the Romans we have many wonderfully preserved specimens in Herculanenum and Pompeii, showing both the arrangements and decorations of the dwellings of all classes. Of the great palaces and villas, however, none remain except the palace of Diocletian, at Spalato, in Dalmatia; an imposing structure which shows many steps in the progress of the style.

See, besides the Handbooks of architecture, R. Adam, Ruins of the Palace of Diocletian (1764); Taylor and Cressy, Architectural Antiquities of Rome (1801); new ed. 1874); Freeman, Historical and Architectural Sketches (1876); T. G. Jackson, Dolus, the Quaerum, and Isitra (3 vols. 1887).

Roman Catholic Church. Cardinal Bellarmine, in his De Ecc. milit., chap. 2, defines the 'church militant' thus: 'An assembly of men united by the profession of the same Christian faith, and by the communion of the same sacraments, under the rule of legitimate pastors, and especially of the one year of Christ on earth, the Roman pontiff.' It is evident that this is really a definition of the Roman Catholic Church. The truth is that the Roman Catholic Church claims exclusive right to the title of Church of Christ on earth, and declares that 'outside of her fold there is no salvation.' This claim of the Church of Rome to be the exclusive means of salvation has been much misunderstood, and calls for some words of explanation. As we intend to remove a misconception, we explain first what the claim does not mean. It does not mean that none but Roman Catholics are in the way of salvation. This is sufficiently clear from the Encyclical letters ('Quanto conficioamur') of Pope Pius IX., dated August 10, 1863. 'It is well known,' writes His Holiness, 'that those who labour under an invincible ignorance concerning our most holy religion, and who at the same time sedulously observing the natural law and the precepts thereof, which are inscribed by God on the hearts of all, are ready to obey God, can, the virtue of divine light and grace working within them, attain to eternal life.' That is to say, then the Roman Catholic Church that none but Roman Catholics are saved. The sense of the axiom 'outside the Church of Rome there is no salvation,' as understood by Roman Catholic theologians, is that, whereas Christ came on earth to establish a church which was to be the divinely appointed means for the salvation of all men, the Roman Catholic Church is that church. Further light may be cast on the sense of this axiom by considering the distinction made by Roman Catholic theologians between the body of the church and the soul of the church. By the body of the church they understand the church considered as a visible and external society. By the soul of the church they understand the supernatural life of the members of the church—that is to say, sanctifying grace. Whoever, then, is in the state of grace belongs to the soul of the church. Whoever is not in the state of grace, even though he belong to the visible and external organisation or body of the church, does not belong to the soul of the church. Now the axiom 'outside the church there is no salvation' has reference primarily to the soul of the church. Thus, then, according to Roman Catholic doctrine, the man who is in the state of grace is saved. The Catholic who dies out of the state of grace is lost.

In the symbol commonly known as the Nicene Creed, faith is expressed in 'one, holy, Catholic, and Apostolic Church.' Christian antiquity then regarded unity, sanctity, catholicity, and apost-
liciety as properties of the true church. The Church of Rome claims to possess these properties, and to possess them manifestly, and in consequence claims to be the only true church of Christ. — The Church of Rome claims to be one, with the complete and most perfect unity, with unity of doctrine, unity of liturgy, and unity of government. (1) With unity of doctrine, the Church of Rome holds, and ever has held, that there are precisely the same faith: the learned, indeed, may have a larger acquaintance with the doctrines of faith than the illiterate; but there is nothing believed by the most learned theologian which is not believed, at least implicitly, by the most simple member of the faithful. The Roman Catholic Church says, 'I believe whatever the holy Catholic Church proposes for my belief.' (2) With unity of liturgy. In every part of the world the Roman Catholic Church offers the same unbloody sacrifice of the mass, everywhere administers the same sacraments, everywhere observes the same seasons and holy days, &c. (3) With unity of government. Roman Catholics, whether living under monarchical or republican governments, whether united to each other or divided from each other by their various nationalities, always acknowledge the same authority in their pastors and bishops, and above all to the Holy See. Indeed, it has perhaps never been denied that with respect to unity the Roman Catholic Church excels all other churches. — The Roman Catholic Church claims to possess visibly the same apostolic succession. She claims to be holy (1) by reason of the holy doctrines which she teaches. Thus, she insists upon the great truth of moral responsibility. She declares that, though man's freedom of will was impaired by the Fall, it was not destroyed, and that no adult can be saved without the due exercise of it. She proclaims that 'faith without works is dead.' She calls upon her children to confront their evil passions with the weapons of fasting and mortification in their hands; holds in high honour the life of voluntary poverty, chastity, and obedience; and declares that such was the life of the Lord and of the precursor of the Lord. (2) By reason of the means of holiness which she provides. Prominent amongst these a Roman Catholic would note that Christ himself has commanded this: 'Ye shall be my witnesses;' and he will also add that, while the Church of Rome accepts the Word of God alone and exclusively as the Rule of Faith, besides the Sacred Scriptures or written Word of God it admits an unwritten Word of God, which possesses an authority equal to that of the written Word. By this unwritten Word of God Roman Catholics understand a body of truths delivered by Christ to the apostles, and by the apostles to their successors, and which were not in the first instance committed to writing. It is certainly worthy of note that Christ himself did not command his apostles to write, but to preach; that only five out of the twelve apostles—reckoning St Mathias in the place of Judas—are recorded to have written anything at all; that three out of these five—St Peter, St James, and St Jude—have left us nothing more than brief epistles, written under particular circumstances, and for special reasons; that more than half of the New Testament was written by inspired men who were not among the apostles to whom the commission was addressed by our Saviour. The church is the depositary, guardian, and living and infallible interpreter of both the written and the unwritten Word of God. It may be remarked, in passing, that there would seem to be some analogy between the Roman Catholic rule of faith and the civil constitution of England. According to Judge Blackstone's Commentary, the municipal laws of England are divided into lex non scripta, the unwritten or common law, and the lex scripta, or statute law; and the common law is the 'first ground and chief corner-stone of the laws of England.' If the question arises as to how these customs or maxims are to be known, and by whom their validity is to be determined, Blackstone decides that the question must be settled by the judges in the several courts of justice, for these judges are 'the depositories of the law; the living oracles, who must decide in all cases of doubt.'
The Church of Rome teaches that no addition has ever been made to the deposit of faith which, by the apostles to the church, and that no objective increase of revelation is to be expected. She does not deny that divine revelations have been made to individuals since the days of the apostles, but she holds that such revelations do not increase the deposit of Christian revelation, and do not constitute an article of Catholic faith to be professed by all the faithful. The faithful are not bound to accept revelations made to private persons, even though the church should express approval of these revelations; for it is understood that it refuses nothing by force of law to guarantee their genuineness. The approval of the church amounts to no more than a declaration that there is nothing in the supposed revelations at variance with sound faith and morality. But though the entire deposit of faith was received by the church from the apostles, it does not follow that all the truths contained in this deposit were revealed explicitly, and have been at all times explicitly taught by the church. There has, indeed, never been any difference with respect to the formal object, as it is called, or motive of faith. The truth has always been accepted on the authority of God who revealed it. But with respect to the material object of faith—i.e. the truths of revelation—there has been this difference, that, while some have been from the first explicitly believed, others were at one time believed implicitly only. The distinct proposition and promulgation of these latter doctrines belongs to the magisterium, or teaching office, which the church exercises under the guidance of the Holy Spirit.

The church fulfills this teaching office in many ways: (1) By indicating in detail the various truths contained in some complex article of explicit faith. Thus, it was always expressly believed by the church that our Saviour was a true and perfect man. But if our Saviour was truly man it follows that he possessed a human body, a rational soul, a human will, and a human heart. From these and various consequences the church distinctly proposed for explicit belief, on the emergence of the Gnostic, Apollinarian, Monothelite, and other heresies at variance with these consequences. Or, to take an instance from Roman Catholic theology, the primacy of the Pope has always been a principle of faith explicitly believed. But, as occasion and circumstances required, the church has proposed for explicit faith one or other of the prerogatives involved in this primacy. (2) By enunciating in particular truths already comprehended in some universal proposition of explicit faith. Thus, while the church had already taught that grace was necessary for all salutary actions and states, on occasion of the Semipelagian heresy it distinctly decreed that grace was necessary for entrance into the way of salvation and for permanent possession of sin. This, and the like, distinctly and articulately what was already believed, though with less distinctness. Thus, according to Roman Catholics, it has always been the belief of the church that it was due to the honour of the Son of God that His mother should be free from sin; and that sin has never been imposed on sinners since the Incarnation; that in recent years of the doctrine of the Immaculate Conception was no more than the distinct and articulate declaration of a truth which had been an object of implicit belief from the first. (4) By expressly declaring some truths which had been, or were, believed only by the ecclesiastics of the church. Thus, the church, by not rebaptising those converted to her fold from heresy, had practically manifested her belief in the validity of baptism conferred by heretics; but when the validity of heretical baptism was impugned she expressly declared that such baptism, however administered, and with whatever form, and intention were employed such baptism was valid. Thus, then, according to the Roman Catholic teaching, there may be truths objectively contained in the deposit of revelation, or the remote rule of faith, which have not been always clearly propounded and promulgated by the particular rule of faith—i.e. the deposit—of the church. Until they are thus proposed and promulgated they may be subject to question without loss of faith; for the unity of faith is maintained so long as there is due submission to the successor of Peter. From this it is clear that many doctrines we may distinguish three distinct phases: (1) In the first instance, they are implicitly contained in revelation indeed, but not yet proposed by the church; and by the faithful they are not explicitly believed, neither are they called in question. (2) Then arises a controversy concerning these doctrines; some are for accepting, others for rejecting them. (3) Finally, the church, either by solemn judgment or by her common teaching, declares that these doctrines belong to the deposit of revelation; and thenceforward they are an object of faith as well as of orthodoxy.

For the teaching of the Roman Catholic Church concerning the Holy See we must refer our readers to the articles Pope, Infallibility, &c. We may, however, mention here that the very name Roman Catholic is intended as an expression of the belief that there can be no true Catholicity without union with Rome. Roman Catholics assert that there can be no catholicity without unity; and that they contend that the See of Rome has always been regarded as the source of unity, and that communion with Rome was regarded by the early church as the ultimate test of orthodoxy. In support of this contention they quote many striking declarations of the Fathers and of the early councils. The name 'Roman Catholic' is not new. Cardinal Newman, writing of the 5th and 6th centuries, says: 'It is more than the Roman patriarchs of old. And thus the college of cardinals was denoted by the additional title of "Romans." Nor was this association of Catholicism with the See of Rome an introduction of that age' (Essay on Development, chap. v.).

The hierarchy of the Roman Catholic Church consists of the Pope, the Bishop of Rome, who is assisted by the Sacred College of Cardinals, and by several sacred congregations, or permanent ecclesiastical committees; of the patriarchs, archbishops, and bishops; of the apostolic delegates, vicars, and prefects; and of certain abbots and prelates. The cardinals, who are the advisers and assistants of the sovereign pontiff, constitute the supreme council or senate of the church; and on the death of the pontiff they elect his successor. The College of Cardinals, who consist of 70 members: 6 cardinal bishops, whose dioceses are the 6 Suburban dioceses of Rome; 20 cardinal priests, who belong to various dioceses, 76 prelates of the States; and 1 Belgian. The sacred congregations, about 20 in number, consist of cardinals, consultors, and officials, and carry on the central administration of the Roman Catholic Church. The following are the principal congregations. (1) The Congregations of Propaganda, which administers the foreign missions, and execution of the decrees of the Council of Trent, and for receiving from bishops reports on the state of their dioceses. Attached to this there is a special Congregation for the Revision of Pro-
vincial Synods. (2) The Congregation of Bishops and Regulars, for judging appeals against episcopal sentences, for the hearing of causes between bishops and regulars, and for the revision and approbation of rules of religious bodies. (3) The Congregation of Propaganda of the Faith, in charge of the study and direction of the faith and the government of the church in non-Catholic countries. Attached to this there is a Congregation for Affairs of the Oriental Rite, with a commission for the revision and correction of Ceremony. (4) The Congregation of Sacred Rites, for the decision of all matters connected with the liturgy, rites, and ceremonies, and for the conduct of the processes of the beatification and canonisation of saints. (5) The Congregation of the Index, for the condemnation of writings prejudicial to faith or morality. (6) The Congrega-
tion of the Holy Office, sometimes known as the Congregation of the Inquisition, for the examination and repression of heretical doctrines. (7) The Congregation of Indulgences and Sacred Relics, for the proclamation of indulgences and the decision of questions relating to them, and for the authentica-
tion and distribution of relics. (8) The Congregation of Ecclesiastical Immunity, for maintaining ecclesiastical privileges and exemptions, as to persons, places, and things. The jurisdiction of the congregations does not cease on the death of the pope, but it is suspended during the process of election, and the business is suspended during the vacancy of the Holy See.

There are 10 patriarchates, with 14 patriarchal sees—8 of the Latin rite, and 6 of Oriental rite. The Latin patriarchates are those of Alexandria, Antioch, and Jerusalem. There are 14 patriarchal sees, Latin, Maronite, Melchite, and Syriac; Constantine, Latrun, Jerusalem, and the See of Constantinople. There are in the con-
munion of Rome, besides the 14 patriarchal sees, 830 archiepiscopal and episcopal residential sees of the Latin rite, and 51 archiepiscopal and episcopal residential sees of the Oriental rite. Besides the archbishops and bishops of these residential sees, there are in Rome 10 metropolitan archbishops and 123 bishops of titular sees. In the British empire there are 123 Roman Catholic residential archiepiscopal and episcopal sees, 23 vicariates-apostolic, and 8 prefectures-apostolic, with a Roman Catholic provincial see of India. Of the 23 vicariates-apostolic in the British empire are held or administered by bishops of titular sees. Titular sees, or, as they were styled till 1882, see in partibus infidelium—i.e. sees which in ancient times existed in those eastern regions which have now lost the faith and fallen into barbarism—are, for the most part, assigned to archbishops and bishops who are appointed to apostolic delegations, of which there are 9, or to vicariates-apostolic, of which there are 125, or to prefectures-apostolic, of which there are 59, or to the office of coadjutor, auxiliary, or coadjutor or vicar-apostolic and vicars-apostolic enjoy episcopal juris-
diction, and exercise episcopal powers, in countries where a hierarchy proper has never been established, or having once existed has been suppressed. With the con-luence of the Pangæan Council in 1870, the Church of England was at first placed under the jurisdiction of archpriests or prefects-apostolic. But in the year 1620 Pope Gregory XV. appointed a vicar-apostolic with juris-
diction over the diocese of London. After sixty years, in 1688, Pope Innocent XI. created four districts or vicariates, the London, Midland, Northern, and Western, appointing to each district its own vicar-apostolic. Gregory XVI. created eight districts or vicariates, the London, Western, Eastern, Central, Welsh, Lancashire, Yorkshire, and Northern, each district having, of course, its own vicar-apostolic. In 1850 Pope Pius IX. re-established the Roman Catholic hierarchy in England, and the nine prelates of the old English hierarchy became bishops of titular sees. Thus, Cardinal Wiseman, who before the restoration of the hier-
archy was vicar-apostolic for the London district, was entitled while vicar-apostolic Bishop of Meli-
potamia. Prefects-apostolic are as a rule not bishops, but they are frequently the principal representa-
tives of the Holy See authority to exercise quasi-episcopal juris-
diction in missionary countries.

As is well known, the Latin rite prevails with few exceptions in the West, and also in some regions of the East; nevertheless various other rites are also followed within the communion of Rome. These are (1) the Greek rite, of which there are the following forms. (a) The Greco-Romanian. There are 3 bishops and 1 archbishop of this rite, whose sees are situated in Austria-Hungary. The lan-
guage of the liturgy is Romanian, excepting the parish of Seausin, in the diocese of Lugos, where the language employed is the ancient Slav. (b) The Greco-Ruthenian. There are 8 bishops and 1 archbishop of this rite, with sees in Austria-
Hungary and Russia. The liturgical language is Illinian. (c) The Greco-Bulgarian. Of this rite there is an archbishop, vicar-apostolic, for Constantinople and its neigh-
brourhood, with 2 bishops, vicars-apostolic, for Macedonia and Thrace. The liturgical language is Illinian. (d) The Greco-Melchite rite is the Melchite patriarch of Antioch, with 4 archbishops and 9 bishops, whose sees are situated in Syria. The liturgical language is Arabic. There are missions in Cessarea in Cappadocia, Constantinople, and Malga in Thrace of the pure Greek rite, which are also in communion with Rome. (2) The Syriac rite, of which there are the following forms. (a) The pure Syriac. Of this rite is the Syriac patriarch of Antioch, with 4 arch-
bishops and 8 bishops, whose sees are situated in Egypt, Syria, and Turkish Armenia. The litur-
gical language is Illinian. (b) The Syro-Chaldaic. Of this rite is the patriarchate of Babylon, with 4 archiepiscopal and 7 episcopal sees situated in Kurdistan, Turkish Armenia, Mesopotamia, and Persia. The liturgical language is Illinian. There are also in the ancient Slav dialects such rite all over Europe, as for instance the Maronite rite of Antioch, and 7 archbishops and 2 bishops, whose sees are situated in Syria, in various other provinces of Asiatic Turkey, and in the island of Cyprus. The litur-
gical language is the ancient Syriac. (d) The Syro-Malabaric. This rite is followed in the vicariates-apostolic of Kottayam and Trichur in the East Indies. The liturgical language is the Syro-Malabaric. (3) The Armenian rite. To this rite belong the Armenian patriarchate of Cilicia, the archiepiscopal sees of Jerusalem and Antioch, the episcopal see of Artin in the Russian empire, and 17 episcopal sees situated in Turkish Asia, Egypt, and Persia. The language of the liturgy is the ancient Armeniam. (4) The Coptic rite. Of this rite there are two forms: (a) the Coptic liturgy is also observed in Egypt, where the Coptic or ancient Egyptian is the language of the liturgy; (b) the form observed in the vicariate-apostolic in Abyssinia, where the liturgical language is the ancient Ethiopic or Geez.

The Roman Catholic populations of the various countries of the world are, according to The States-
man's Year-book (1900), as follows: Great Britain and Ireland, 5,415,000; Austria-Hungary, 27,756,000; Belgium, 6,650,000; Denmark, 3,647; France (1881) 29,201,703; Germany, 17,675,000 (including
Greek Church); Greece, about 12,000; Italy, 31,757,000; the Netherlands, 1,596,000; Portugal, 5,049,000; European Russia, 8,300,000; Spain, 17,536,000; Sweden and Norway, 2,400; Switzerland, 84,000; European Turkey, estimated at 1,000,000; total Roman Catholic population in Europe, approximately 155,130,000, while Mulhall's Dictionary of Statistics (1895) states it at 162,310,000.

The latter quotes the American Statistical Society's figures of Roman Catholic population (1883) of the grand divisions, as follows: Europe, 160,380,000; Africa, 3,010,000; America, 2,660,000; Oceania, 657,000; grand total, about 225,000,000, as against the 240,000,000 estimated in Hazell's Annual for 1897.

See Cardinal Manning's Temporal Mission of the Holy Ghost; Newman's Essay on Development of Doctrine; Wiseman's Lectures on the Catholic Church; Ward's Essays on the Church's Doctrinal Authority; Murphy's Chair of Peter (1888); Leibnitz's System of Theology, translated by Russell (1890); Catholic Directory (Burns and Oates); Missions Catholiques (Propaganda Press, Rome). The organisation and statistics of the Catholic Church will be found in the relevant paragraphs on the several Catholic countries. The more important Catholic documents are all dealt with in separate articles in this work; as are also the saints and thinkers. See especially the articles:

Absolution. 
Apostles. 
Apostolic Succession. 
Aquila. 
Aquinas. 
Architecture. 
Atonement. 
Baptism. 
Bishops. 
Books. 
Bible. 
Bishop. 
Canon Law. 
Canons. 
Canonical. 
Canonisation. 
Cathedral. 
Catholic. 
Celtic. 
Censures. 
Confession. 
Conclave. 
Concordats. 
Convents. 
Credence. 
Dominicans. 
Enthusiasm. 
Excommunication. 
Faith. 
Fatima. 
Fellowship. 
Ferar. 
French. 
Franciscans. 
Gallican Church. 
Greek Church. 
Heli. 
Hymns. 
Imagery. 
Immaculate Conception. 
Incarnation. 
Indulgence. 
Infallibility. 
Inquisition. 
Isaac. 
Jesuits. 
Liturgy. 
Liturgy. 
Lord's Supper. 
Martyrs. 
Mary. 
Mass. 
Monachism. 
Newman. 
Orders. 
Penance. 
Peter. 
Prayer. 
Priesthood. 
Relics. 
Reservation. 
Sacraments. 
Sacrifice. 
Sorbon. 
Supercession. 
Transubstantiation. 
Trent. 
Vulgata.

Roman Catholic Emancipation. See Catholic Emancipation.

Romance Languages, a general name for those languages that are the immediate descendants of the language of ancient Rome. In those parts of the empire in which the Roman dominion and civil institutions had been most completely established the native languages were speedily and completely supplanted by that of the conquerors—the Latin. This was the case in Italy itself, in the Spanish peninsula, in Gaul or France, including parts of Switzerland, and in Dacia. When the Roman empire was broken up by the invasions of the northern nations (in the 6th and 7th centuries) the invading tribes stood to the Hellenic invaders in the relation of a ruling caste to a subject population. The dominant Germans continued, where established, for several centuries to use their native tongue among themselves; but from the first they seemed to have acknowledged the supremacy of the Latin for civil and ecclesiastical purposes, and most of the language of the rulers was merged in that of their subjects; not, however, without leaving decided traces of the struggle—traces chiefly visible in the intrusion of numerous German words, and in the mutilation of the grammatical forms or inflections of the ancient Latin, and the substitution therefor of prepositions and auxiliary verbs. It is also to be borne in mind that the language which underwent this change was not the classical Latin of literature, but a popular Roman language (lingua Romana rustica) which had been used by the side of the classical, and differed from it—not to the extent of being radically and grammatically another tongue—but chiefly by slightly pronounced, the neglect or misuse of grammatical forms, and the use of 'low' and unusual words and idioms. As distinguishing the Romance from the Latin, the absence of the functions of the church, the school, and the liturgy, this newly-formed language of ordinary intercourse, in its various dialects, was known from about the 8th century as the lingua Romana; and from this name, through the adverb Romanice, came the term Romance, applied both to the language and to the popular Latin written in it, more especially to the dialect and poems of the troubadours. The Romance languages recognised by Diez are six: Italian, Spanish, Portuguese, Provençal, French, and Roumanian. Ascend and newer investigators treat the Romance of the Grisons as a seventh sister-tongue; and each of these have more or less numerous dialects.

According to the theory of Raymonard, the new language that sprang out of the corruption of the Latin was at first essentially the same over all the territories occupied by the Romans, and is preserved to us in a pure state in the Provençal, or language of the troubadours; and it was from this as a common ground, and not from the original Latin, that the several Neo-Latin tongues diverged into the different forms which they now present. This theory is not accepted by all investigators. Its groundlessness was demonstrated by Cornwall Lewis. It is beyond doubt that the several daughters of the mother Latin had their characteristic differences from the very first, as, indeed, was inevitable. The original Latin spoken in the several provinces of the Roman empire must have had very different degrees of purity, and the corruptions in one region must have differed from those in another according to the nature of the superadded tongues. To these differences in the fundamental Latin must be added those of the superadded German element, consisting chiefly in the variety of dialects spoken by the invading nations and the different proportions of the conquering population to the conquered. French, as was to be expected, is richer in German words than any other member of the family, having 450 for every 100 in the other tongues. French, however, is not in this respect, but on the whole is nearest to the mother Latin. Spanish and Portuguese have considerable Arabic elements; and Roumanian was much modified by Slavie. The Romance tongues further differ from the common parent in simplifying or dropping the inflections of nouns, substituting for these the use of prepositions, and simplifying the verbal forms by a free use of auxiliary verbs. The six great Romance tongues and their literatures are treated in the articles on Italy, Spain, Portugal, Provence, France, and Roumania, to which may be added the Romansh.

See Cornwall Lewis, On the Origin and Formation of the Romance Languages (24 ed. 1682); Diez, Grammatik der Romanischen Sprachen (1836-38; 4th ed. 1877), and his dictionary, the great Wörterbuch (1853; Eng. trans. 1874); Gregorovius, Geschichte der Philologie Romane (1874); works on Romance philology by Körting (1884), Gröber (1886), and Neumann (1896); the magazine 'Romantische Studien' (1871 et seq.), and that of Gaston Paris, 'Romantica' (1873 et seq.).

Romances. Romance has long since lost its original signification in every country except Spain, where it is still occasionally used in speaking of the various languages. It was in the time of the old Latin was the language of the lettered classes and of documents and writings of all kinds. But even there its commoner application is, as elsewhere, not to a language, but to a form of composition. In English it has been almost invariably applied to a certain sort of prose fiction, and, in a secondary
sense, to the style and tone prevailing therein. But the romances, in the sense in which we generally mean the prose fictions which, as reading became a more common accomplishment, took the place of the lays and Chansons de gestes (q.v.) of the minstrels and trovâtres, and were in their turn replaced by the novel. Of these the most important stories were those which combined elements of chivalry, which may be considered the legitimate descendants of the Chansons de gestes. The chivalry romances divide naturally into three families or groups: the British (which, perhaps, would more properly be called Anglo-Celtic, as they are of Norman or Anglo-Norman), the French, and the Spanish; the first having for its centre the legend of Arthur and the Round Table; the second formed round the legend of Charlemagne and the Twelve Peers; and the third consisting mainly of the Romance of the Three Gauntlets, which was set among the imitations and imitations of one kind or another. In strict chronological order the Charlemagne cycle should stand first, for the Charlemagne legend was apparently of an earlier formation than the Arthurian; but on the other hand the materials out of which the Charlemagne romances were made are, comparatively speaking, the younger, and the prose romances which either grew out of it or were grafted upon it are for the most part of an earlier date than those belonging to the Charlemagne story.

The first appearance of Arthur is in the history of the Bretons in twelve successful battles fought with the Saxons; but it is in the Historia Regum Britanniae of Geoffrey of Monmouth (1140) that he first appears as the hero of a round table. Geoffrey himself, in fact, may be fairly claimed as the founder of the Arthurian legend. Whatever his materials may have been or whatever the source from which he obtained them, he contrived to give them "un caractère chevaleresque et ctoir" to use the words of M. Gaston Paris, which was altogether foreign to them when they came to his hands, and thus succeeded in presenting a picture of Arthur and his court which at once proved acceptable to the age in which he lived. It is this character, impressed upon the Arthur legend by Geoffrey, that was presented to us by the Anglo-Norman one. It was Arthur, head of chivalry and chivalry romance, as he does in Don Quixote (part I, chap. xiii). The story, however, as Geoffrey left it, is little more than the foundation of the structure raised by his successors a century later.

Whether we attempt in its entirety or in part only his account of the 'very ancient book' from Brittany which he professed to have translated, or hold that his authorities were simply Nennius, Welsh traditions, and Breton lays and tales, it is clear that his sources of information conveyed no hint of the Round Table or of the Grail, to say nothing of Lancelot and other personages who have come down to us as part and parcel of the Arthurian story. The first reference to the Round Table is in the Brut of Wace (1155), which is in fact an amplified metrical version of Geoffrey's History, and from the words used by Floris, Artus la roonde table, dont Breton dient mainte fable—we are left to suppose that it was through Breton tradition that it found its way into the story. By some it has been conjectured that in the Old French volsels endowed itself imperiously in the Peers of the Charlemagne legend, but in truth the two institutions represented two totally distinct ideas. The peers were simply a fraternity, "xii. companions," as the Chanson de Roland calls them, bound together by mutual affection although in Charlemagne the Grail is wholly unimpressed by the sovereign. The Round Table, on the other hand, was a knightly fellowship in which the bond of union was the pursuit of chivalrous adventure and "deeds of prowess," of which the king was the head, and by which he was "upborne" and the quiet and rest of his realm insured. The distinction deserves notice, for it is characteristic of the difference between the two legends and the romances that represent them. The Arthurian romances were purely and completely chivalric; the Grail was reserved for courtiers, sometimes knights—if we may trust the statements of early editors, they were written to order at the instance of magnates, among whom Henry II. and Henry III. of England are named, and at any rate addressed to what would now be called the "aristocracy of society." With the Carlotvingian it was very different; the Chansons de gestes from which they were derived were made for and sung to no one class in particular, and it is manifest that the selection for translation into prose was always governed by considerations of popular interest. Hence the phenomenon noticed by more than one observer, that the Arthurian stories have never become in the strict sense of the word popular in any age or country, while the Carlotvingian have enjoyed a wide-spread popularity, and in many cases have continued to hold their own as popular stories down to the present day. Mr. J. A. Symonds observes that in Italy the Arthurian stories, though relished by the cultured classes, never took the fancy of the people at large in the same way as the Carlotvingian; and in Spain the romances and ballads of that treat of Arthur are few and meagre, while the Charlemagne literature is extensive and rich, and the History of Charlemagne and the Twelve Peers is still a current châp-book in high request. At any rate, no obscure question is how the Holy Grail came to be linked to the Arthurian story. There can be no doubt that Celtic tradition and mythology present sufficient analogies to justify a theory that the idea of the Grail is a purely Celtic one which may be traced back to pagan times. But none of these analogies is that of the healing cup or the mystic basin which figures in Perceval, can be in any true sense called a Grail. The essence of the Arthurian Grail lies in its character of a Christian relic, and the very name suggests that the conception as it is there presented to us was an Anglo-Saxon one. It is possible, perhaps, that a difficult translation of Arthurian stories into Anglo-Saxon may have had a share in shaping the conception, but that is all that can be safely said. Some little light, perhaps, is thrown on the question by the curious coincidences between the Grail and the Holy Grail in a vision in the year 717, which Robert de Borron (circa 1190) sets up as the prime authority for his Saint Grail, and the vision in the same year in which the Grail itself was seen by a British hermit, as recorded by Helimaud in 1204. The return of the first Crusaders stimulated that enthusiasm for relics of the Passion of which we have a proof in the Sacro Catino at Genoa and its rivals. A very natural consequence would be an eagerness to discover the hiding-place of the true catino, and this, when the Round Table idea had been once imported into the Arthurian story, would give the Holy Grail an 'implicit bond of worship' par excellence necessary to its constitution, while an equally natural consequence would be that the poets in working out the idea would avail themselves of any floating traditions of mystic wine that could be pressed into their service. Arthur himself, no doubt, was treated in the same fashion. Hero-worship is almost always accompanied by annexation. The Charlemagne legend is largely made up of fragments that properly belong to Charlemagne, or to Bald. Even in the comparatively modern ease of the Cid, one of the most famous exploits, the unseating of the
French ambassador, is in reality the property of the 15th-century Conde de Cifuentes. It would be strange if so remote a figure as Arthur's conversion from heathenism to Christianity did not involve some process; but even if we find there, as Professor Rhys holds, traces of the culture of the hero, or of the solar myth, the question of his personality cannot be said to be thereby affected. It would be almost as unreasonable to treat him as a purely mythical being on account of the absence of any trace of human substance as to deny Sheridan's existence because jokes attributed to him are to be found in early editions of Joe Miller. There is very little certainty connected with the construction of the Arthurian story. It seems plain that the History of the Grail, which probably constituted the prequel, was in an earlier composition; and the respective shares of Chrétien de Troyes and Robert de Boron in the Grail, Percival, and Lancelot are pretty clearly defined. But in most other respects the Arthurian cycle deserves the title M. Gaston Paris applies to it of 'déda de incontrôlable.' In no case, as Mr Alfred Nutt says, do we possess a primary form; all the versions that have come down to us presuppose something earlier; all is uncertainty, the order in which the component parts were produced, the sources from which they were drawn, the authors by whom they were attributable, the relationships of the various versions and forms one to another; and research seems ever to reveal new nebulae and discover fresh clusters of difficulties. Even on the question as to whether the primary form was in verse, as analogy would lead us to expect, we are for the most part left to conjecture. That Breton popular poetry may have contained the germ of Tristan, Tristram, Percival, and Lancelot is no doubt a probability; but of one thing at least we may be certain, that veritable creations like the Lancelot of the Arthur story cannot take their place in the legend without which we have examples in the translated specimens of Marie de France. The stones may have come from a Celtic quarry, but the building was Anglo-Norman.

It was inevitable that the Arthur stories proper should be followed by romances, a supplemental or an introductory character, such as Melius, Guiron le Courtois, Artus de Bretagne, and Percéforest, but it would be an injustice to treat these, as Dunlop has done, as though they were legitimate members of the Arthurian cycle, nor have I even been able to include in it the works of the compilers or authors who have now and then attempted to present it in a consecutive shape. \textit{Faute de princes} of these is our own Sir Thomas Malory, whose work is, as Dr Sommer says in his masterly edition, 'by far the best guide to the Arthur romances in their entirety.' Malory's judgment may not be, perhaps, invariably impeccable. He has not always chosen the best or most poetical form, and he has left unexplored many beauties of the old MSS. This may not have been so much his fault as that of the materials with which he had to content himself. The lack of general knowledge and skill there can be as little question as of his English which has made his book one of the classics of his language. Malory, furthermore, as the exhaustive researches of Dr Sommer show, is the sole authority for portions of the series, in particular the story of Galien, with which he left a lacuna.

In the romances of the Chalirenge cycle we stand on much firmer ground. It is true that we know even less of the authors than in the case of the Arthur stories, but on the other hand the whole process of production lies plain to view. The result of the advent of the minstrelsy to the disaster of Roncevalles, and the Song of Roland—not, of course, the Chanson de Roland that has come down to us, but some other form, the existence and nature of which are matters of inference—may be taken as the foundation of the whole Chalirenge. And among the romances it is said that this, apparently, we have a prose version at the end of the Latin history of Charlemagne, which pretends to be the work of his contemporary the Archbishop Turpin. Nothing was farther from the intention of the writers than to produce a romanesque, but among the romance of the France at the head of them, their work must be placed. And if there be no mistake, By Charlemagne's example it points out the advantages here and hereafter of serving the church liberally and zealously, endowing holy shrines, encouraging pilgrimages, founding hospitals, or exterminating them when unconvincible. It records the pilgrimage to Compostella made by Charles at the call of St James, and is plainly the work of different hands. M. Gaston Paris believes the first five chapters to have been written by a monk of Compostella about 1050; but it is not very obvious why a Spaniard who had his own national legend of Compostella should have gone out of his way to make a patron of a foreigner and an invader. The remainder, he thinks, was written by a monk of Vieenne between 1109 and 1119. The book was soon translated into several languages, and became the source of the story of Roland and Roncevalles, for which it was believed to be the prime authority until the discovery of the chanson proved the existence of a common ancestor. The influence of the latter was mainly through the chansons de gestes of which it was in most cases the model. Of these the number is large. M. Leon Gautier's list enumerates above a hundred belonging to the Charlemagne cycle, and this of course only represents survivors. Only a few, however, gave birth to prose romances. The Roland had been forestalled by the Turpin history, and of the Roncevalles, as well as of the earlier, the local, not sufficiently popular, or for other reasons unsuitable for prose. The story of Ogier le Danois (who possibly had nothing to do with Denmark, but was merely warden of the Ardenne-mark) was too famous to be left in the verse of Aldeens le Roy; the traditions of the struggles between the royal line and his vassals in Aquitaine, not so much in Charlemagne's time as in Pepin's, lent an interest to Renaud de Montauban, the Rinaldo of Italian poetry, but best known as the hero of the \textit{Four Sons of Aymon} (q.v.), a romance that has probably been wholly composed by the compilers or arrangers who have now and then attempted to present it in a consecutive shape. Of all the romances of this sort are our own Sir Thomas Malory, whose work is, as Dr Sommer says in his masterly edition, 'by far the best guide to the Arthur romances in their entirety.' Malory's judgment may not be, perhaps, invariably impeccable. He has not always chosen the best or most poetical form, and he has left unexplored many beauties of the old MSS. This may not have been so much his fault as that of the materials with which he had to content himself. The lack of general knowledge and skill there can be as little question as of his English which has made his book one of the classics of his language. Malory, furthermore, as the exhaustive researches of Dr Sommer show, is the sole authority for portions of the series, in particular the story of Galien, with which he left a lacuna.

In the romances of the Chalirenge cycle we stand on much firmer ground. It is true that we know even less of the authors than in the case of the Arthur stories, but on the other hand the whole process of production lies plain to view. The result of the advent of the minstrelsy to the disaster of Roncevalles, and the Song of Roland—not, of course, the Chanson de Roland that has come down to us, but some other form, the existence and nature of which are matters of inference—may be taken as the foundation of the whole Chalirenge. And among the romances it is said that this, apparently, we have a prose version at the end of the Latin history of Charlemagne, which pretends to be the work of his contemporary the Archbishop Turpin. Nothing was farther from the intention of the writers than to produce a romanesque, but among the romance of the France at the head of them, their work must be placed. And if there be no mistake, By Charlemagne's example it points out the advantages here and hereafter of serving the church liberally and zealously, endowing holy shrines, encouraging pilgrimages, founding hospitals, or exterminating them when unconvincible. It records the pilgrimage to Compostella made by Charles at the call of St James, and is plainly the work of different hands. M. Gaston Paris believes the first five chapters to have been written by a monk of Compostella about 1050; but it is not very obvious why a Spaniard who had his own national legend of Compostella should have gone out of his way to make a patron of a foreigner and an invader. The remainder, he thinks, was written by a monk of Vieenne between 1109 and 1119. The book was soon translated into several languages, and became the source of the story of Roland and Roncevalles, for which it was believed to be the prime authority until the discovery of the chanson proved the existence of a common ancestor. The influence of the latter was mainly through the chansons de gestes of which it was in most cases the model. Of these the number is large. M. Leon Gautier's list enumerates above a hundred belonging to the Charlemagne cycle, and this of course only represents survivors. Only a few, however, gave birth to prose romances. The story of Ogier le Danois (who possibly had nothing to do with Denmark, but was merely warden of the Ardenne-mark) was too famous to be left in the verse of Aldeens le Roy; the traditions of the struggles between the royal line and his vassals in Aquitaine, not so much in Charlemagne's time as in Pepin's, lent an interest to Renaud de Montauban, the Rinaldo of Italian poetry, but best known as the hero of the \textit{Four Sons of Aymon} (q.v.), a romance that has probably been wholly composed by the compilers or arrangers who have now and then attempted to present it in a consecutive shape. Of all the romances of this sort are our own Sir Thomas Malory, whose work is, as Dr Sommer says in his masterly edition, 'by far the best guide to the Arthur romances in their entirety.' Malory's judgment may not be, perhaps, invariably impeccable. He has not always chosen the best or most poetical form, and he has left unexplored many beauties of the old MSS. But this may not have been so much his fault as that of the materials with which he had to content himself. The lack of general knowledge and skill there can be as little question as of his English which has made his book one of the classics of his language. Malory, furthermore, as the exhaustive researches of Dr Sommer show, is the sole authority for portions of the series, in particular the story of Galien, with which he left a lacuna.
romances linked with the Charlemagne cycle; Cleomades, or Climates, where Cervantes found the magic wooden horse, which by a lapse of memory he assigns to Pierre de Provence and Magalona, another romance of the same kind; Porteopenas de Blois; Melusina: The Knight of the Three Heads; Sagram, translated by Beaugues for his Speculum Historiale, from which it passed into the shape of a romance, and was translated into English at the instigation of Edward, Duke of Buckingham, who claimed to be one of the knight’s descendants.

Cervantes correctly claims Amadis de Gaula as the founder of Spanish chivalry romance, though he may have been in error as to its being the first work of the kind printed in Spain; the Valencian Tirant to Blanc must have preceded it. It was long hailed as the actual work of the great poet, but the statement of González de Azurara that it was entirely the work of Vasco de Lobeira; but there is ample proof that an Amadis was extant in Spain at least as early as the middle of the 14th century, very probably as early as 1300, but at any rate before Lobeira was born. Sometimes the history of its composition was not forthcoming, may be excused for asserting the Portuguese origin of the romance; but it is strange to find M. Gaston Paris still describing it as ‘portugais espagnol aux XV° et XVI° siècles.’ Whether this Amadis was in verse or in prose is uncertain; we only know from one witness that it was in three books, and Garei de Montalvo, who is responsible for the existing Amadis, merely claims to have corrected three books, which previous editors and scholars had left in a corrupt state, and to have added a fourth. Nor is it a certainty that it was of purely Spanish origin. The influence of the Arthurian romances is manifest, but what is far more suspicious is the absence of Spanish colour and indications of Spanish parentage; the names are almost all akin to those of the Arthur stories, the same theme is repeated, and the scene throughout is laid on Arthurian ground. Wales, England, Brittany, or Normandy, a choice not easily explained in a romance whose business was to interest Spanish hearers or readers. Whether or not the original may have been some northern French story, it certainly was known, as has sometimes suggested, Amadis y Yñoces in which there is no more resemblance to Amadis than there is in Ausassin and Nicelette.

The earliest known edition of the Amadis (q.v.) is of 1508, but this cannot be the first; it is too near the date of other romances obviously inspired by it and born of its success, and it is evident that it was finished shortly after the fall of Granada in 1492. The date is significant in its bearing on the curious phenomenon of the sudden outburst of chivalry romance literature in Spain, just as the middle ages were drawing to an end and other nations were beginning to put away chivalry among the brie-á-brac of hygine days. But in Spain it marked the close of a campaign of seven centuries and the end of a national life of sustenance under one rule. Under the circumstances, the triple despotic, of crown, church, and Inquisition, the nobles and minor nobility were left with a superabundance of leisure on their hands, a condition, as every sensible librarian knows, always favourable to the production of works. This is a point on which Montalvo could not have chosen a better time for his venture. But it would be unjust in the extreme to deny the meritorious Amadis their share in the creation of Spanish chivalry romance. In almost every respect, story, incidents, characters, and human interest, it will bear comparison with the best of its predecessors, and as a romance of chivalry, pure and simple, it has no equal. In this lay the secret of its success. For Spain chivalry romance had been entirely unknown elsewhere. Amadis came to a generation which, through the apocryphal and Isabella knights who could match any of Arthur’s or Charlemagne’s in exploits. Coming at such a time it is no wonder that Amadis was followed by a cry for more, and that more was produced, some of it by Fioravante, Floriart, Lisart, Amadis of Greece were of a very different vintage. It was by Belciano de Silva, the object of Cervantes’ special detestation, that the work of continuation was chiefly carried on. He was a clever man, with a facile pen, and if not imagination, at least invention in abundance, but his greatest gift was his intuitive perception of the tastes of his readers. He perceived that it was not so much recreation as excitement they wanted, and that so far from objecting to rant, bombast, and extravagance the more they got the more they pleased. He seems to have been the first author who reduced writing nonsense to a system, and also the first who made a handsome fortune by his writings. The professed continuations formed, however, only a small portion of the romances, nor was there an imitation in the original, and infected by the style of Belciano de Silva, the Felizmartz, Belianises, Olivarites, which continued to flow from the press until the long line ended with Pellecian de Boecia, two years before Don Quixote was sent to the press.

With Don Quixote, fittingly, the history of romances as a branch of fiction comes to a close. There are, indeed, two other groups that claim the title, the Pastoral, and those sometimes called the Heroic, an epithet better deserved by the readers who were bold enough to face entertainment in such a formidable shape. But to these quite as much space as their merits entitle them to has been already given (see NOVELS).

See Paulin Paris, Les Romas du Table Rond (1868-77); Gaston Paris, La Litterutre Francaise au Moyen Age (2d ed. 1867-1868); De Pecado Turpino: Hist. Caroli Magni (1865); Oskar Sommer, Morte Darthur (3 vols. 1889); A. Nutt, Studies on the Legend of the Holy Grail (1888); Pro- fessor Ulys, Recherches sur Don Leonor (1889); J. Uriach, Merlin, Roman en Prose d’apres le MS. app. à M. Huth (Société des Anciens Textes Francaises, 1886); W. F. Skene, The Four Ancient Books of Wales (1868); J. S. Stuart Glennie, Arthurian Literature (1868); Birch-Hirschfeld, Die Sage vom Gral (1871); Herz, Sage vom Parzival und dem Gral (1882); E. Martin, Zur Gral Sage (1880); H. Zimmer (on the Bronté sources of the Arthur Legend—Göttingische Gelehrte Anzeigen, Oct. 1900); L. Gautier, Les Epopées Francaises (1878-82); Meizi, Bibliografia dei Romani Italiani (1865); Gayangos, Libro de Caballería (lib de Arbeus de Lindsay, vol. 4); Prose heroico-popular Castellana (1874); Turpinii Historia Caroli Magni, Texte Recue par F. Castets (1880); Ward, Catal. of Romances in the Dept. of M.S., British Museum (1888); Quatremère, History of London (1891); Early English Text Society’s publications; Romania; many papers by Gaston Paris; the section on Literature in the article Spain: George Santayana, The Flourishing of Romance (1897); W. P. Ker, Epic and Romance (1897).

Roman de Rou. See WACÉ.

Roman Empire, Holy (more fully in German, Heiliges Römisches Reich Deutscher Nation), the official denomination of the German empire from 962 down to 1806, so that the last king of the empire, Francis II, resigned the imperial title. The Western Roman empire came to an end in 476 A.D.; Charlemagne sought to reconstitute it when he was crowned
Romans, George John, naturalist, was born at Kingston, Canada, on 20th May 1848, and after a private education in London and on the Continent entered Gains College, Cambridge, and graduated in science honours. While a student at the university he formed a friendship with Darwin, and he has powerfully reinforced his master’s arguments in his Croonian, Fullerian, and other lectures, and in his various works—Animal Intelligence (1851); Scientific Evidences of Organic Evolution (1859); Mental Evolution in Animals (1883); Jelly-fish, Star-fish, and Sea-urchins (1885); Mental Evolution in Man (1888); Darwin and after Darwin (1892); Examination of Weismannism (1893; see WEISMANN). This most fertile English writer on the theories and philosophy of modern biology, in a posthumous work, Thoughts on Religion, edited by Canon Gore, showed that, once a defiant agnostic, he had become almost, if not altogether, a Christian; and in this spirit he had before his death revised his Condensed Examination of Theism (1873). He was F.R.S. and LL.D., Life of Letters by his wife (1896), and his Poems (1896).

Romanesque Architecture, the delasped style which succeeded Roman architecture from about the time of Constantine (330 A.D.) till the revival in the 11th century. Roman Architecture (q.v.), itself a transitional style, fades gradually into the Romanesque. When Constantine gave the Christians freedom of worship, he gave architecture a new start; and noble buildings resembling the Roman Basilica (q.v.) were built as churches all over the empire. These consisted of three- or five-aisled halls—the aisles separated by rows of columns. In Rome the columns, entablatures, and other ornaments were frequently taken from the ruins of ancient buildings which abounded there. The new style is therefore closely allied to the ancient one in the imperial city; but in Ravenna, Jerusalem, Provence, and the remoter districts, where few ancient remains existed, a simpler and ruder copy of the ancient work is found. There is always, however, a certain resemblance to the old forms which distinguishes the Romanesque from the round-arched Gothic which succeeded it. The piers along the aisles are always single columns, generally with caps intended to be Corinthian, and the arches are pointed, with stone or wooden roof; and there are remnants of entablatures, mouldings, &c., which recall the ancient Roman work. The early Christians also derived their round churches from the Romans. They were probably originally tombs, copied from such buildings as the Myrsvva Medica (see ROMAN ARCHI-
ROMANS

ROMANTICISM

chap. xvi., which stands by itself, the epistle consists of two portions, marked off respectively by the doxology in xii. 36, and by the benediction in xv. 33. The first portion, which is mainly doctrinal, again falls into two sections—i.—viii. and ix.—xvi.—in the former of which the Pauline doctrine of justification by faith is explained. The need for a justification through grace and received by faith alone, if there is to be effectual justification at all, is elaborately shown, and the doctrine is vindicated, historically and experimentally, against controversial objections, first from the religious, and then from the natural point of view. In the second division of the first portion the disparagement and neutralisation of the divinely bestowed privileges of Judaism apparently involved in the preaching of this doctrine without restriction among the Gentiles are considered. The second, or practical, part of the epistle deals with points of Christian morality and problems of Christian tolerance.

The epistle is addressed to the Christians in Rome. Who these were—whether they were Jews or the followers of the Gentiles—whether they had come to be Christians, can only be conjectured. It is impossible to infer much about them or their circumstances from the epistle itself, for the church in Rome was not one with which the apostle, at the time of writing, was personally acquainted. More probably, the numbers or proportions the Jewish-Christian and Gentile-Christian elements existed within it; but he was warranted in assuming (as he seems to have done) that it contained both, and that the conversion of which he had heard, the only too familiar elsewhere might break out at any moment in Rome also. The epistle gives no support to the tradition that the church in Rome had been founded personally by Peter; but doubtless it had relations with Jerusalem, and so may well be believed to have owed something to his indirect influence, at least. The immediate object of the apostle Paul in writing to the Romans when he did is easily explained by the outward and inward circumstances through which, as we know, he was at the time passing. Having completed his preaching in the western empire, he intended to return to Jerusalem and Illyricum (xv. 19), he was purposeful to extend his apostolic activity among the Gentiles westward as far as to Spain; and with a view to his success in the new field it was only natural that the tone of the epistle should be that of a possible misconception of his teaching, and to prepare for it a friendly and sympathetic reception in the metropolis of the world.

The Pauline authorship of the epistle as a whole has never been called in question; indeed it is one of the four canonical epistles which, along with the Apocalypse, were regarded by Baur as the only quite indubitable relics we possess of the apostolic age. Baur, it is true (following Marxim), rejected chaps. xv, and xvi, regarding them as additions of the 2nd century. His argument was based chiefly on the supposed incomprehensibility of the introduction to the epistle and the possibility, to which Baur was disposed to attach the. whole passage, that it might be the result of a later hour. But the possibility of the genuine character of the various suggestions, both internal and external, which indicates that these chapters are somewhat loosely attached to the main body of the epistle; in some ancient copies it closed with xiv. 23, immediately followed by xvi. 25-27 (see Revised Version, margin). The argument is strengthened by the fact that various schools is that they consist of a postscript, or postscript, or (the view of Lightfoot) that at some period after the original composition and transmission of the epistle the apostle, in order to adapt it for a wider circulation, re-issued it with omission of the last two chapters, as also of the word Rome at the beginning. Schultze in 1829, following up a hint of Semler (1769), suggested that xvi. 1-20 was really a fragment of a Pauline epistle to the Corinthians in the light of the various modifications, has been accepted by very many critics, among whom may be mentioned Reuss, Renan, and B. Weiss. See the introductions of Reuss (6th ed. 1887), B. Weiss (2nd ed. 1889; Eng. trans.), and Holtmann (2nd ed. 1893) for these views, and their development by Philipps, Jewett, Goshed, Gifford (in Speaker's Commentary), Monle (in Cambridge Bible), Liddon (1895), Lipsius, and Sanday and Headlam (1896).

Romansch (Ger. Schwedisch, from the town of Chur), a name applied to the Romance dialect, or rather amalgamation of cognate dialects, spoken from the Grisons to Friuli on the Adriatic. Ascelin includes all varieties under the common name of Laotino, although strictly that term applies to the dialect of the Engadine, as distinguished from that of the upper Rhine valley. There are dictionaries by Couradi (Zur, 1829) and Carisch (Chur, 1821). See also J. Ulrich's Rhätoromanische Christenmärche (1852-83) and Rhätoromanische Texte (1883-84).

Romanticism (through the adjective romantic, from romant or romani), a term applied to the feelings and thought that has transformed the literature and art of most nations, has been defined by Dr Theodore Watts as 'the renascence of the spirit of wonder in poetry and art.' It was a revolt against pseudo-classicism; a return from the monotonous commonplace of everyday life to the quaint and unfamiliar world of old romance; a craving for the novel, original, and adventurous; an empressing of the interesting, the picturesque, the 'romantic,' at the expense, 'if need be, of correctness and elegance, and the current canons of 'good taste.' Deep humour, strong pathos, profound pity are amongst its notes. Romanticism is not necessarily limited to any one period; there are romantic elements in Homer, Æschylus, Sophocles; the poetry of Dante is eminently romantic when contrasted with the classical poet, and that of Milton; but though what is romantic for one generation tends to become classic—and so tame, though not really insipid—for a later one, and though the romantic is almost inevitably one side of a truly artistic temperament, there are special romantic epochs, e.g. in the 18th century, in certain writers in those epochs more romantic than their fellows. The 18th century was notoriously classic in ideal, or pseudo-classic—conventional, pedantic, academic; and the revolt against spiritual ennui which followed is the romantic movement pur excellent. The movement arose under various conditions in the several countries, had a somewhat varying character and course, and sometimes tended towards the merely crude and grotesque. In England, the fountainhead of the movement which culminated in the beginning of the 19th century, and that 'hearts and Drang' period was largely romantic in its temper; but it was Novalis who was the prophet of 'romanticism,' and among the other representatives of the school were the Schlegels, Tieck, Kleist, Fouqué, and Hölderlin. The beginnings of romanticism are traced by Rousseau in Chateaubriand, and others; but the great chief of French romanticism is Victor Hugo. Other French romantics are Lamartine, Dumas, Gautier, George Sand, Flan bert,
Mürger. The romantic movement in the three countries is discussed in the articles on the literature of each (English Literature, Vol. IV. p. 375; Germany, Vol. V. p. 188; France, Vol. IV. p. 789). The other countries were more or less moved by the same spirit; see also the articles on the literatures of the principal countries. The influence of Percy's Reliques is traced in the article Ballad. In Germany romanticism included the love of the medieval an affection for the oriental; in religion it led some of its notable representatives to Catholic ideals and into the Catholic Church; and in politics it was associated with reactionary conservatism. The aims of the romantics in painting are defined at Painting, Vol. VII. p. 700; see also Pre-Raphaelitism. In music Weber has been called the 'creator of romantic opera'; but see Opera, Vol. VII. p. 608. Berlioz is regarded as the type of French romanticism in music.

See (under Idea) Idealism, Realism; Pater in Macmillan's Magazine, vol. xxxv.; for Germany, the works by Julian Schmidt (1848), Haym (1871), Brandes (1873); for France, Stendhal, Racine et Shakespeare (1823); Gautier, Histoire du Romanticisme (4th ed. 1884); and many essays by Sainte-Beuve and Scherer.

**Romany.** See Gypsies.

**Rome,** the capital of the modern kingdom of Italy, stands on the Tiber, about 15 miles from its mouth. Roman legend ascribed the foundation of the city to Romulus, at a date corresponding to 753 B.C. But recent explorations have proved that the site was inhabited in the neolithic and early bronze period. The existence of a town with a considerable population at a time long before the date ascribed by tradition to the foundation of the city has been established by the discovery in 1874 of a cemetery on the Esquiline, near the railway station, which contained pottery of the type usually assigned to the 9th or 10th century B.C. In the time of the kings (753-510 B.C.) the city occupied seven hills, whose summits rise from 80 to 120 feet above the river and the intervening valleys. These hills are believed to have been formed by subaerial erosion of beds of soft tufa previously erupted by submarine volcanoes. Of these seven hills— the Palatine, the Capitoline, the Aventine, the Caelian, and the Esquiline—being more or less isolated, were termed *Montes,* and two, the Quirinal and Viminal, being mere spurs jutting out from the tableland to the east, were called *Colles.* The Esquiline, however, is properly rather a Collius than a Mons, being connected with the tableland by a narrow neck. The Palatine and the Capitoline, being the most defensible sites, were doubtless the first to be occupied, and this accords with the Roman legend, which makes the Palatine the site of the primitive city founded by Romulus, the Capitoline being occupied by a rival Sabine

![Map of Ancient Rome](https://example.com/roma_map.jpg)

Map of Ancient Rome:
The positions of a few of the more important modern places of interest are also indicated; the ancient names being given in Italics and the modern in Roman letters.

settlement which, under Tatius the Sabine king, soon extended to the Quirinal, a contiguous spur of the tableland, separated only by a narrow valley from the Capitoline. We are also told that the Aventine, which after the Palatine and the Capitoline was plainly the most desirable site, was occupied by a colony of Latins in the time of Ancus Martius, the fourth king. Under Servius Tullius, the sixth king, the Esquiline, together with the Viminal, which is a mere spur of the Esquiline, is said to have been added to the city. These legends conform to the probabilities of the case.

The settlement on the Palatine attributed to Romulus was fortified at a very early period,
possibly about the date assigned to the foundation of the city. Remains of this earliest wall have been discovered in the course of recent excavations. The stone walls were squared, and a related wall, consisting of large stones fitted together without mortar, was built up from the base of the slope, rendering the hill almost impregnable. The Palatine was thus made into a sort of artificial plateau, with the marshy hollows between them, thus enclosed. The rampart was raised, or agger of earth, faced with an exterior wall of unmortared masonry, which is still in one place 50 feet in height, with an inner retaining wall of similar construction. Outside the rampart was an enormous fosse, which from recent excavations appears to have been in some places 30 feet in depth and 100 feet in breadth, from which the materials for the agger were obtained. In the construction of this rampart the older walls, which ran along the crests of the Palatine and Capitoline hills, were retained, and the agger can only be traced where it crossed the intervening valleys, or where it protected the spurs where they joined the tableland. The agger, begun probably by Tarquinius Priscus, has received the name of Servius Tullius, by whom probably the agger was extended, and the Esquiline was completed. At a considerable distance from this agger may be conveniently examined in the goods yard of the railway station. An excellent cross-section is exposed on the northern crest of the Quirinal in the Via di S. Andrea. The agger, which may be traced in the gardens of the Barberini and Colonna palaces, is cut by most injury employed in the construction of roads, and the remains of the agger may also be seen in the valley below the southern slope of the Aventine.

For 800 years, till the reign of the Emperor Aurelian, the Servian agger formed the only defence of the city. The wall which bears the name of Aurelian is to a great extent identical with the present walls. It enclosed the suburbs which had grown up beyond the Celian, the Esquiline, the Quirinal, and the Capitoline hills, and included the agger. The Servian agger of the Esquiline was completed. It was restored and partially rebuilt by Honorius and repaired by Belisarius. It is 12 miles in circuit. The Leonine Wall, enclosing the Vatican Hill and the remainder of the Janiculum, was built by Leo IV, in 848. In 1227 some additional space on the Vatican was enclosed, and bastions to strengthen the weak parts of the old wall were added. At the present time populous suburbs have arisen to the east and north beyond the walls, while to the south extensive spaces on the Vatican were enclosed, and bastions to strengthen the weak parts of the old wall were added. In 1888 no less than 1465 acres, chiefly on the Celian and the Aventine, were occupied by vineyards, fields, and gardens, while public gardens and squares occupied 106 acres.

To the period of the kings belongs the Cloaca Maxima, a large subterranean sewer of Etruscan masonry, which drained the marshy hollow between the Capitoline, Palatine, and Esquiline hills. A portion of this valley became the Forum Romanum, at once the market and the place of political meeting for the Romans, Sabine, and Latin tribes, who occupied the surrounding hills. The Cloaca Maxima (q.v.), though the oldest and best known of the sewers, is rivalled in magnitude by two other ancient sewers which enter the Tiber nearly opposite the same point. The well-known Mamertine prison at the foot of the Capitol, now consecrated as the submarine church of St. Pietro in Carceri, was a deep vaulted well from which, and from the Tiber, the water-supply must have been obtained during the Roman period. The Tiber was supplied with water by aqueducts from the Alban hills and the Apennines this well, perhaps the most ancient structure in Rome, was converted into a dungeon, in which state-prisoners, among them Jugurtha and the Catiline conspirators, were confined, by way of punishment. In the period of the Empire the well was, as is known, ever confined here a mere legend, of no authority or probability.

In the great aqueducts we have the most notable remains of the Republican period. The oldest was the Aqua Appia, constructed by Appius Claudius Censor in 312 B.C., which brought water from springs upwards of seven miles distant from the city. The Anio Vetus, 43 miles long, was commenced in 275 B.C., and brought water from the river Anio. The Aqua Marcia, 62 miles in length, was constructed by M. Tarpeius, and completed about B.C. 127, or 121 years after the aqueducts from the Alban hills at a level sufficiently high to supply the Capitol. The Aqua Julia, the Aqua Claudia, and the Anio Novus, constructions even more gigantic, date from the imperial age. Altogether there were fourteen of these aqueducts, each with an aggregate length of 481 miles. The Romans employed vast structures, striding on the arches across the Campagna, and still bringing copious supplies of water from the Apennines and the Alban hills, are among the most striking features of modern Rome. A portion of one of these aqueducts was in use until 1870, when the Aurelian Wall, the arches being simply built up with masonry. The remains of the enormous arches by which the water of the Aqua Claudia was brought across the deep valley between the Celian and the Palatine also exhibit the vast scale of these erections (see AQUEDUCT).

In the time of the Republic the centre of the public life of the city was the Forum Romanum, an oblong space, containing about 23 acres, surrounded by shops (tabernae). It was traversed by the Via Sacra, a width of 300 feet, along which the processions passed to the Capitol. The great blocks of lava with which this road was paved still, for the most part, remain in situ. The Temple of Vesta and the House of the Vestal Virgins stood on one side of the Forum, the Palatine, and on the other side was the Regia, or House of the Pontifex Maximus. Close by were the rostra, the beaks of captured Carthaginian ships, between which was the platform from which orators harangued the people. Further to the north-east was the Senate House, whose walls are preserved in those of the church of S. Adriano; the neighbouring church of Ss. Luca e Martina being constructed out of the offices of the Senate House. Beyond the Senate House stood the Treasury and the Tabularium. In course of time the open space of the Forum became occupied with stately public edifices, of which the most conspicuous remains are the eight columns of the Temple of Saturn, built in 401 B.C., the Colonnade of the Twelve Great Gods (deorum consuetum), the Temple of Vesta, the Temple of Castor and Pollux, in 496 B.C., of Vesta, of Julius Caesar, of Vespasian, and of Faustina. We see also the foundations of the Triumphal Arch of Augustus, the vast ruins of the Basilica Julia, the base of the column of Phocas, and the milestone from which all Roman roads were measured. To the north of the Forum stands the Triumphal Arch of Septimius Severus,
to the south the Arch of Titus (see ARCH). So much of the open space of the Forum became occupied by great public monuments and edifices that in the time of the emperors additional fora were required. These were erected on the eastern side of the Forum Romanum. Of the Forum Julianum only three arches of the outer wall remain. Of the Forum of Augustus a portion of the enclosing wall, a massive archway, and three columns of the Temple of Mars Ultor, which stood within the Forum, now cleared of rubbish, are among the most imposing and accessible remains of the architecture of the early empire. Of the Forum of Nerva two columns may be seen in the Via della Croce Stadium the most perfect in existence, imperial reception-halls, several temples, with gardens, baths, barracks for soldiers, and a basilica or hall of justice, in which St Paul must have pleaded before the emperor. The Golden House of Nero, built on the opposite side of the Forum, and occupying the greater portion of the Oppian Hill, was demolished to make room for the Colosseum and the Baths of Titus, so that practically nothing is left save some substructures, the cisterns known as the Sette Sale, and the base of the colossal statue of Nero, which stood in front of the Golden House.

Of the numerous temples in Rome, of which there are said to have been three hundred, the naves and in many cases the sites, of 133 are known. The foundations of the great Temple of Jupiter Capitolinus may be traced in the gardens of the Caffarelli Palace, now the German embassy. Of the temples which remain the preservation is due in several cases to their having been converted into churches. The columns in front of the church of S. Lorenzo in Miranda, which faces the Forum, formed part of the Temple of Antoninus and Faustina. Ten columns of the Temple of Ceres are built into the walls of S. Maria in Trastevere. S. Maria del Sole is a round temple formerly called the Temple of Vesta, but now believed to be the Temple of Hercules Victor. Another temple, supposed to be the Temple of Fortuna Virilis, is now the church of S. Maria Egiziaca. The church of Ss. Cosmo e Damiano is the Temple of Aurora Urbs, erected by the Emperor Maxentius.

In the center of the Temple of Venus and Rome, built by Hadrian, is preserved in the church of S. Francesco Romana. It is believed that the church of Ss. Sergio e Bacco was the Temple of Concord, that the church of S. Stefano Rotondo was the Temple of Mater Matuta, and that of S. Nicola in Ariccia was the Temple of Piety; while Santa Maria in Trastevere Minerva stands on the ruins of a Temple of Minerva, S. Maria Liberatrice probably occupies the site of a Temple of Vesta, and the round church of S. Teodoro was a temple of unknown attribution. In 27 b.C. Agrippa built a vast dome in front of the Temple of Mars which he erected in the Campus Martius. It is called by Pliny and other writers the Pantheon, and may have served as a sort of entrance-hall to the Temple. In 608 it was consecrated as the church of S. Maria ad Martyres, and now goes by the name of S. Maria Rotonda. All the buildings of ancient Rome have since been entirely rebuilt or altered. The diameter of the dome, which is lighted only by a central aperture in the roof, is larger than the dome of St Peter's; the walls, 10 feet in thickness, have deep niches which were filled with statues of deities; and the floor is of Purpurian and Numidian marbles, with porphyry and siller as slabs.

The Thermus of Agrippa, of which the Pantheon is the only portion that remains, were the earliest of the eleven great public baths which formed so characteristic a feature of imperial Rome. The Thermus of Trajan, mentioned by Tacitus, built on the site of the Golden House of Nero, occupied almost the whole of the Oppian Hill; but of these baths little is left save the foundations. On the slope of the Quirinal stood the Thermus of Constantine. In the Piazza del

The Forum Romanum at the present time.
Quirinal stand two colossal horses from the thermae which occupied the site. In the formation of the steps which lead down from the piazza, and of the Via Nazionale, substructures belonging to these thermae were discovered, and portions of their massive walls may be seen in the gardens of the Colonna and the Casino di Pincio. At the other end of Rome, on the low ground south of the Caelian, are the ruins of the Thermae Antoninianae, usually called the Baths of Caracalla, by whom they were begun in 212 A.D., and completed by Alexander Severus. They were built to accommodate a large population and to show the magnitude of the projects, as a quarry, are still the vastest, and in their desolation perhaps the most impressive, of all the ruins in Rome. The lofty walls are still standing, and, as the halls have been cleared of rubbish, the arrangements of Roman thermae (see BATH) can here best be studied. We see the Calidarium, the Tepidarium, and a Frigidarium, with an Exedra and a Stadium or racecourse. The outer wall encloses a space of nearly 27 acres, of which the baths themselves occupy more than 6 acres. Farther on still lies the Thermae Diocletian, on the summit of the Quirinal, designed to accommodate 3000 bathers. The semicircular curve which forms such a conspicuous feature in the Piazza delle Terme was the exedra of these baths. One of the smaller circular halls forms the church of S. Maria degli Angeli, which is converted by Michelangelo into the magnificent church of S. Maria degli Angeli. Another hall is used as a prison, another as a fencing-school, others serve as barracks, stables, coach-houses, and warehouses for timber, while the cloisters of a Carthusian convent built out of the ruins are now converted into a museum.

A large marshy plain, which now forms the most densely populated part of Rome, lay outside the Servian Walls, extending from the foot of the Capitoline and Quirinal hills to the Tiber. This, being used for military exercises, was called the Campus Martius. Towards the close of the republican era this suburban plain began to be used in the formation of public buildings, such as bath, theatres, and racecourses. These were connected by the Porticae, a network of colonnades forming covered walks, serving as a protection alike from the sunshine and the rain, along which the citizens could stroll to the various places of recreation and amusement. The Campus Martius was traversed by the Flaminian Way, approximately represented by the modern street called the Corso, which was bordered on either side by the stately tombs of Roman nobles, and spanned by the triumphal arch of Claudia, and by that of Marcus Aurelius, demolished in 1662. On these fields were built the Baths of Agrippa and the Baths of Nero. Here was erected the Theatre of Balbus and the vast Theatre of Pompey, said to have contained seats for 40,000 spectators. This last was renamed the Theatre of the Scipios and is seen behind the church of S. Andrea della Valle. Somewhat nearer to the Capitol was the Theatre of Marcellus, which a considerable portion still stands, forming one of the most characteristic examples of Roman architecture of the best period. This was included with the Theatre of Agrippa, and finished in the year 11 B.C. by Augustus, who named it after his nephew Marcellus, the son of Octavia. In the 11th century, like the Colosseum and the Mausoleum of Hadrian, it was turned into a fortress by the family of the Orsini-Savelli. The interior is now occupied by the Palazzo Orsini-Savelli, while the outer arches are used as rag-shops and smithies.

In the same characteristic Roman style as the Theatre of Marcellus, but of a more debased type, is the great Flavian Amphithetre, built for gladiatorial exhibitions and for the combats of wild beasts, which goes by the name of the Colosseum. Commenced by Vespasian, it was dedicated by Titus 80 A.D. It is called the Flavian or the Domitian. It is built in the form of an ellipse, the longer diameter measuring 135 feet and the shorter 510 feet. It rises to a height of 160 feet, covering five acres of ground. In the middle ages it was used as a fortress and afterwards as a quarry; but, though so long looted and almost destroyed, it is perhaps the most imposing monument of Roman magnificence which is left (see AMPHITHEATRE). The earlier amphitheatres were mostly of wood, and have perished. The Piazza di Monte Citorio on the Corso is believed to occupy the site of the Amphitheatre of Statilus Taurus, erected in 31 B.C., the foundations having been found 88 feet below the present surface of the street. At the side of the church of S. Croce in Gerusalemme are considerable remains of the Amphitheatre of Caligula (see CAESAREA). This was utilized in the construction of the Aurelian Wall, from which it protrudes, forming a sort of semicircular bastion. Below was the Circus of Elagabalus, from which came the Egyptian obelisk now in the Pincian Gardens.

The oldest circus was the Circus Maximus, in the valley behind the Palatine Hill. It is supposed to date from the regal period, but was enlarged by Julius Caesar. It was about three furlongs in length and one in breadth, nearly the size and shape of Eaton Square, and is said to have been capable of seating 250,000 spectators. The site is now occupied by the Jewish cemetery and the gas-works. The arrangements of a Roman circus can best be studied in the well-preserved circus on the Appian Way, near the tomb of Cecilia Metella, built in 311 A.D., which usually bears the name of the Emperor Maxentius, but is more correctly assigned to his son Romulus. It is 330 yards long and 86 broad. The mete, the spina, the course, and the seats for the emperor and the spectators may still be traced. An Egyptian obelisk from this circus now adorns the Piazza Navona (see CIRCUS).

Of the Circus of Flaminius, built in 220 B.C. on the Campus Martius immediately below the northern slope of the Capitoline Hill, no vestiges remain. The same is the case with the Circus of Nero on the Vatican, which occupied the hollow between S. Peter’s Church and the Vatican Gardens through which the visitor now drives to the Vatican Museum. While the circus was designed for chariot-races, the stadium was used for foot-races. Of these there were several, but the Imperial Stadium on the Palatine, between the house of Augustus and the buildings of Septimius Severus is the only one which remains in a tolerable state of preservation. The Stadium of Domitian on the Campus Martius is believed to be represented by the present Piazza Navona, recently renamed the Piazza di Barberano; the modern theories are about the size and shape of St George’s Square, Pimlico, or the site of the Houses of Parliament.

The roads leading out of Rome beyond the Servian Walls were bordered by tombs, many of which, on the erection of the Aurelian Wall, were included with the city. On the Appian Way (q.v.) are the tombs of the Scipios, the inscriptions on which, forming the earliest contemporary records of Roman history, are among the treasures of the Vatican. Farther on four ancient columbiae have been identified, the most famous of which is the Tomb of Cecilia Metella (see ROMAN ARCHITECTURE), wife of the triumvir Crassus, which in the 13th century was converted into a fortress.
by the Gaetani family. It is a cylindrical block of masonry, 65 feet in diameter, resembling the keep of a feudal castle. Another remarkable tomb is the Pyramid of Caius Cestius in the Via Ostiensis. The most magnificent of Roman tombs was the Mausoleum of Hadrian, now the castle of S. Angelo. It was a cylindrical tower of masonry, 340 feet in diameter and 163 feet in height, surmounted by a colossal statue of the emperor. When the Goths besieged Rome the tomb was converted into a fortress by Belisarius. It afterwards became the castle of the popes, and citadel of Rome, and in 1527 was defended against the French by the Popes' and the Tiber. From the remains of the Colosseum, which stood behind the great church of S. Carlo al Corso. In the middle ages it formed the castle of the Colonna family, and is now occupied as the Teatro Corea. Two obelisks of Egyptian granite faced the entrance, one of which now stands in the Piazza di S. Maria Maggiore, and the other fronts the Palace of the Quirinal. In all there are eleven Egyptian obelisks which ornament the gardens and piazzas of Rome. Two stand near the Pantheon, and stand in front of the church of San Siro; another, before which they were originally erected. Another, now in the Piazza del Popolo, was brought from Heliopolis by Augustus, and placed in the Cireus Maximus. That in the Piazza di Monte Citorio was also brought to Rome by Augustus. That in the Piazza of S. John Lateran, 104 feet in height, is the largest in existence. It was erected at Thebes by Thothmes III., and removed by Constantine to the Cireus Maximus. The obelisk in the Piazza di S. Pietro was brought from Heliopolis by Caligula, and placed in the Cireus of Nero, now called the Esquiline. On the Pincian is an obelisk of Hadrian; and there is another in the gardens of the Villa Mattei.

Of the triumphal arches those of Augustus, Tiberius, Claudius, Marcus Aurelius, and Trajan have disappeared. The Arch of Septimius Severus, which spanned the Sacred Way just as it began to climb the Capitol, remains in a fair state of preservation. At the other end of the Forum, also spanning the Sacred Way, is the Arch of Titus, with the well-known reliefs representing the spoils from the Temple at Jerusalem (see Arch). A short distance westward along the Appian Way stands the Arch of Constantine, fronting the Colosseum and the three huge arches of the Constantine Basilica. The so-called Arch of Drusus crosses the Appian Way where it passes through the Aurelian Wall. The Arch of Dacia, built in 18 A.D., is almost hidden in the brickwork of the Aqueduct of Nero, called the Aqua Claudia; and the Arch of Gallienus on the Esquiline, erected in 262 A.D., is in the degraded style of the time. See Arch (Triumphal). The bridges over the Tiber and the other three are survivals of the eight or nine ancient bridges. The oldest is the Pons Fabricius, built in 62 B.C. by L. Fabricius, leading from the city to the island in the Tiber. The Pons Cestius, believed to have been built by the Emperor Gratian, leads from the city to the right bank of the Tiber, and the Pons Aelius, now called the Pons S. Angelo, was built by Hadrian in 135 A.D. in front of his Mausoleum, and now serves as the approach to St Peter's and the Vatican. The Ponte Rotto, or 'broken bridge,' was part of the Pons Aemilius, but no picture remains till the recent 'improvements.' It is now replaced by a suspension bridge. The Ponte Sisto was built by Pope Sixtus IV. to replace the Pons Aurelius.

Modern Rome.—It is impossible within moderate limits to give an adequate account of Rome, which contains more objects of interest than any other city in the world. A bare enumeration of facts must therefore suffice. The Observatory in the Collegio Romano is situated in 41° 53' 32" N. lat. and 12° 28' 40" E. long. The population was 226,622 in 1870; 272,560 in 1876; 300,467 in 1881; 401,044 in 1886; 417,036 in 1891. The walls, which enclose 3860 acres, are 14 miles in circuit. Of the fifteen gates, two of which are closed, since 1870 more than 3000 new houses have been built, 52 miles of new streets have been formed, and 51 millions sterling have been spent by the municipal on the improvement of the city. During the progress of the railway into Rome, 1873-85, there were 2560 lamps, 191 marble statues, 266 busts, and 36,770 coins have been found. There are twelve bridges, five of which are old, and the rest comparatively new. The chief gates are the Porta del Popolo and the Porta Pia on the east, the Porta S. Lorenzo and the Porta Maggiore on the west, the Porta S. Sebastiano and the Porta S. Paolo on the south. Old Rome stands on the left bank of the Tiber; on the right bank, occupying the Vatican and Janiculum hills and the low ground between these hills and the river, are St Peter's, the Vatican Palace, the Vatican, and the Tiber. The chief part of the city occupies the plain on the left bank between the hills and the river, traversed by the Corso, the principal thoroughfare of Rome, about a mile in length, leading from the Porta del Popolo to the foot of the Capitoline Hill. From the Piazza del Popolo to the gate of Montecitorio, on the left side of the Corso, the Via di Ripetta to the right, skirting the Tiber, and to the left the Via del Babuino, leading to the Piazza di Spagna, whence the Scalo di Spagna, the resort of artists' models, ascends to the Pincian Gardens, on the site of the gardens of Lucullus, which commanded the Identify the city, and form the fashionable drive and promenade of the Romans.

Before Rome became in 1870 the capital of Italy, the greater part of the Pincian, Quirinal, and Esquiline hills was occupied by villages of the Roman nobles, with extensive gardens planted with box and vines. With two exceptions these have been destroyed, and their sites have been covered with modern houses, and too often by blocks of ugly barnack-like buildings, many stories in height, let out in tenements. The two picturesque and picturesque hills are assuming the aspect of modern capital, broad, straight thoroughfares having been driven through quarters formerly occupied by narrow streets and mean, crowded houses. Of the new streets the most important are the Via Venti Settembre, from the Porta Pia to the Quirinal, and the Via Cavour and the Via Nazionale, which lead from the railway station, the first to the Forum, and the second to the lower end of the Corso. This is continued to the west by the Corso Vittorio Emanuele as far as the Borgo, crossing the Tiber by a modern bridge fed by the railways, and lay at the foot of the Pincian, around the Piazza di Spagna, but the healthier sites on the slopes and summits of the Quirinal and Esquiline are now more frequented.

Of the palaces the largest are the Vatican, the residence of the pope, the Lateran, the ancient residence of the King, but formerly a papal palace, in which the conclaves were held for the election of the popes. Many of the palaces of the Roman nobles contain collections of pictures and statuary. Chief among them are the Palazzo Borghese, containing the most spirited collection of pictures in Rome, the Palazzo Colonna, Doria, Barberini, Rospigliosi, Chigi, Torlonia, Farnese, Corsini, and di Venezia, now the Austrian embassy. Among the notable villas are the Villa Borghese, standing in a great park below the
Pincian; the Villa Ludovisi, on the Pincian; the
Villa Albani, outside the Porta Salaria; and the
Villa Medici, on the Pincian, now the Academica
Filibrighth, in a splendid collection of casts of
the gardens of the Villa Mattei, on the Caelian, com-
mand one of the best views in Rome. The pictur-
esque arches of the Aqua Claudia traverse the
gardens of the Villa Wolkonsky.

Besides the private collections Rome abounds in
public collections. The most important of these is
Collegio Romano, formerly a Jesuit college, is now occupied by a public library of modern books called the
Biblioteca Vittorio Emanuele, and the Kircherian
Museum of Antiquities, and by a well-arranged
prehistoric and ethnological museum. The Palazzo
di Conservatori, on the Capitol, contains many of
the best ancient statues. In the cloisters of the
Carthusian convent in the Thermes of Dio-
cletian are stored the antiquities brought to light
during the recent excavations. Others from the
excavations at Palerl are collected in the Tempio
di Papa Giulio, outside the Porta del Popolo.
The Villa Medici contains a good collection of
casts from ancient statues. The Lateran Palace
contains an unrivalled collection of inscriptions
and sculptures from the Catacombes, and a few
greek statues and mosaics. The Lateran is ex-
territorial, and the Museum is the property of
the popes.
The chief papal collections are contained in the
galleries attached to the Vatican, probably the
largest palace in the world. In addition to the
private gardens and apartments of the pope, the
Vatican Palace comprises immense reception-halls
with a series of chapels, libraries, picture-galleries, and
vast museums of sculptures, antiquities, and
inscriptions, which can here be only enumerated in
the list. The first collection, the Lateran, was built
by Sixtus IV., is covered with magnificent frescoes
of Michelangelo and the great Floren-
tine masters. The Capella Nicolina, built by
Nicola V., and the Pauline Chapel, built by Paul
III. in 1590, are also painted in fresco; the first by
Fra Angelico, and the second by Michelangelo.
Raphael's Stanze and Loggie are halls and salons
covered with inimitable frescoes executed by
Raphael, Perugino, Giulio Romano, and other
masters of their school. Beyond the Loggie is the
picture-gallery, containing the collection of the
Popes in Rome. The world-famous Vatican
Library, with its priceless MSS., its collections of early
printed books, of Christian antiquities, ancient
maps and jewellery, is contained in
two immense halls. The vast sculpture-galleries,
with their unrivalled collections, comprise the
Museo Chiaramonte, the Braccio Nuovo, and the
Museo Pio-Clemente, which includes the Cortile
di Belvedere, containing the Laocoon, the Apollo
Belvedere, and the so-called Antinous, perhaps the
most beautiful statue in the world. The inscrip-
tions are contained in the Galleria Lapidaria, the
Etruscan antiquities in the Museo Gregoriano,
below which is the Egyptian Museum.
The churches, said to be upwards of 300 in num-
er, are among the most conspicuous features of
modern Rome. Many of them are rather what we
should call mortuary or memorial churches, opened	only once a year on the festival of the saint
to whom they are dedicated. There are also the
churches of the great religious orders, twenty-eight
parish churches, and the titular churches of the
curia. The papal churches are the five
patriarchal churches, the seven piligrimage
churches, and the eight basilican churches. Others
are interesting either from their early date, their
historical associations, from the archaeologcal or
artistic treasures they contain, or from the frag-
ments of earlier structures which they enclose.
First in rank are the five patriarchal churches. S.
Giovanni in Laterano (see LATERAN), between the
Caelian and the Esquiline hills, ranks as the first
church in the Western world. It dates from the
time of Constantine. It was, till the building of
S. Peter's, the metropolitan cathedral of Rome and
of the western patriarchy. It retains its 5th-cen-
tury baptistry and the 13th-century cloisters, the
most beautiful in Rome. The Santa Scala, brought
by the Emperors Constantine and Helena from the
4th century, has been the object of veneration among
pilgrims. The church itself was burned down and
rebuilt in the 14th century, and has been repeatedly
altered and modernised. The adjoining palace
of the popes is now converted into a museum, chiefly
of Christian antiquities. S. Pietro (see St. Peter
in Vaticano), the largest church in the
world, was rebuilt in the 16th century from
the designs of Bramante, Michelangelo, and Ber-
nini. It was begun in 1506, and consecrated in
1626. It is in the form of a Latin cross, with a
vast central dome. The interior length is 675 feet,
the height of the nave 150 feet, and of the cross
which surmounts the dome 435 feet. S. Paolo
fuori le Mura, a vast 4th-century church, was
before the fire of 1823 the most interesting church in
Rome, but has been entirely altered and
modernised. It is of magnificent size. S. Lorenzo
fuori le Mura, occupying the site of a church founded by
Constantine, was rebuilt in 578, and remodelled in
the 13th century, but still retains the ancient marble
and granite columns. The Basilica Liberiana, on
the Esquiline, is commonly called S. Maria Mag-
core, being the largest of the eighty churches in
Rome dedicated to the Virgin Mary. It is one of
the oldest churches in Rome, the nave dating from
the 5th century.

These five patriarchal churches, together with
S. Croce and S. Sabazio, constitute the seven
ancient pilgrim churches. The five patriarchal
churches, together with S. Agnese, S. Croce, and
S. Clemente, are the eight basilican churches.
S. Agnese fuori le Mura was founded by Constantine,
and rebuilt in the 7th century. It contains many
early Christian inscriptions. S. Croce is a 5th-
century basilica, and is said to have been erected
by the Empress Helena. S. Clemente is the
most archaic church in Rome. The upper church
dates from the 12th century; the lower, which is entirely
underground, from the 4th; and the columns are
far older substractions dating from the imperial
and republic periods. In addition to the eight
basilican churches, others already mentioned con-
serve the remains of earlier buildings. S. Maria
in Cosmedin, one of the most interesting churches in
Rome, preserves ten columns of the Temple of
Ceres, out of which it was constructed, and
twenty ancient columns taken from other build-
ings. It also has a beautiful tesselated pavement
of ancient marbles. S. Maria degli Angeli and
S. Lazzaro were constructed out of the Thermes
de Diocletian, and S. Pietro in Carcere out of
the Mamertine prison. S. Giorgio in Velabro, a 4th-
century church, was rebuilt in the 7th century,
but preserves sixteen of the ancient columns. S.
Costanza, outside the Porta Pia, was erected by
Constantine, and contains interesting 4th-century
mosaics. The granite columns in S. Maria in
Araceli, on the Capitol, have been taken from
some earlier building. On the Caelian we have SS.
Giovanni e Paolo, founded in the 6th century and
rebuilt in the 14th; S. Stefano Rotondo, a 14th-
century church, containing the episcopal throne of
Gregory the Great; and the interesting church of
S. Gregorio, built in 575 on the site of his
father's house. On the Aventine are S. Balbina
and S. Sabina, both of the 6th century. On
the Esquiline are S. Ponenziana, a very ancient
church, with 4th-century mosaics, probably constructed in the time of Pope Innocent III. S. Prassede, another 5th-century church, with ancient granite columns and 9th-century mosaics; and S. Pietro in Vincoli, a 5th-century basilica, with twenty ancient Doric columns, and containing Michelangelo's statue of Moses, and the supposed tomb of St Peter, which was undoubtedly presented by Pope Leo I. to the Empress Eudoxia in 442. On the right bank of the Tiber are S. Crisogono, a 12th-century church, with ancient porphyry columns and a fine mosaic pavement; S. Maria in Trastevere, a 5th-century church; the Lateran, with two ancient columns, some fine mosaics, a splendid marble pavement, with numerous interesting early inscriptions in the portico; S. Cecilia has 9th-century mosaics; while the Piazza of S. Pietro in Montorio commands the finest view of Rome. S. Maria sopra Minerva, near the Pantheon, the chief Dominican church, is the only Gothic church in Rome. Among the vast modern churches are the Gesù, the gorgeous church of the Jesuits, containing the tomb of S. Ignatius Loyola; S. Carlo al Corso, now the fashionable church of Rome; S. Maria della Vallicella, commonly called Chiesa Nuova; and the Cappuccini, with its catacombs and Guido's picture of St Michael.

One of the greatest improvements which has been effected is the embankment of the Tiber, and the straightening and deepening of its channel. This has put a stop to the disastrous floods by which the lower parts of the city were formerly inundated. But the municipality being now practically bankrupt, the grandiose schemes for the further reconstruction of the city, and for making Rome a modern metropolis, can only be carried out by the Tiber, are for the present suspended.

In addition to the objects of interest which have been brieferly enumerated are the vast Catacombs (q.v.) extending underground for many miles, the Ghetto, the Sapienza, the Propaganda, and the Protestant cemetery with the tombs of Keats and Shelley. The best panoramic views of Rome are from the Tincio, the Villa Mattei, S. Pietro in Montorio, the Janiculum, the garden of the Priorato di Malta, and from outside the Porta S. Giovanni. Rome is now a fairly healthy city, except in winter, when the mouth of the Tiber is unfrozen, and the unceasing quantity, and the streets are well cleansed. No city excels Rome in its public fountains.

There are practically no manufactures in Rome. Hats, gloves, neckties, false pearls, and trinkets are made, and there are cabinet-makers, and a few foundries on a small scale, but compared with other great cities the absence of factory chimneys is very notable. There are printing-offices, but the Italian book-trade is centred at Milan. The chief industry is the manufacture of small mosaics, some of which are exported; carpet-makers are the most prosperous; and original or copies of the works of the great masters.

All the necessary life have to be imported from a distance, the Campagna which extends for many miles around Rome being uninhabitable on account of the malaria. It is an unenclosed and unhealthful country, and the temperature of the home, and cattle. Corn and wine are brought from Tuscania, and from the fertile Terra di Lavoro near Naples. The prosperity of the city depends on the expenditure of the courts of the Quirinal and the Vatican, of the army of functionaries in the public offices, of the clergy and of the tourists, who crowd the hotels during the winter months. The railways from all parts of Italy converge outside the city, which they enter near the Porta Maggiore on the Esquiline, and have a common terminus on the summit of the Quirinal close to the Baths of Diocletian. The omnibus service is good, and well-managed trams traverse several of the broad new streets.

See R. Burn, Rome and the Campagna (1770); J. H. Parker, Archæology of Rome (1852-80); T. Ilyer, City of Rome, its Vicinities and Monuments (2d ed. 1883); F. W. Bist, Rome; E. F. Agee, and R. Lanzi, Ancient Rome in the Light of Recent Discoveries (1888); with other works by Gell, Nich. Haz., Professor Middleton, &c., and those cited on p. 784.

ROMAN HISTORY.—Rome, the 'Mistress of the World,' the 'Eternal City,' gives name to a political empire which lasted twelve centuries, till its transfer to Byzantium, where it lasted eleven centuries more; also to a religious empire which since 42 A.D. has acquired spiritual sway over a yet larger dominion than its pagan predecessor, and which, in accord with imperial Germany, formed the twin-faction of the Holy Roman Empire, dissolved in 1806.

Colonised in the bronze age by Alban shepherds who migrated from their hills in fear of volcanic disturbance, Rome, according to her officially adopted legend, dates from 21st April 753 B.C., when Romulus, the first of her seven kings, settled on the Palatine mount. From his quadrilateral stronghold—Roma quadrata—he made conquest of the Capitoline and Quirinal. After his successor Numa, the Cahun was annexed by Tullus Hostilius and the Aventine by Ancus Mareius. To the hills, now five under Tarquinius Priscus the fifth king, were added the Esquiline and Viminal by Servius Tullius, who walled in the seven with a stone fortification. So that under her seventh and last king, Tarquinius Superbus, the City of the Seven Hills was already 'built for empire,' on marshy soil made habitable by drainage, and which was by board by the Tiber—a waterway so clearly the 'outlet of her supremacy,' as to warrant the derivation of 'Rome' and 'Romulus' from the teum or river.

Latin in population, with a Sabine infusion, Rome was divided into three tribes—the Ramnes, the Tubuluses, and the Luceres, and again into thirty curiae. The tribal division disappeared early; that into curiae lasted well into republican times. Out of the curiae, originating in common religious observances, grew the populus Romanus, including all the Latin and Romans. Its king (rex) was not always hereditary either in his regal or his religious capacity, nor merely elective. When a king died, his successor was chosen by the heads (patres) of families (gentes). These patres—the guardians of religious observance, of popular right, of state interests—and power to choose a pro-visional king (inter-rex), who, with the patres for assessors, decided on the new king, who was then proposed to the curiae in assembly (comitia curiata) and, if approved, confirmed by the patres.

The king had now absolute authority, civil, religious, and military, subject only to the councillors—the senate—having the above indicated powers, always subject to the king, who consulted them at pleasure, and filled up vacancies. In solemn assembly the Romans met in the Forum under the king or inter-rex, who put questions to the senate, who were curator of the city, turn, its vote being determined by the majority within itself, and the preponderance of these votes deciding the result.

Romulus, Numa, Tullus Hostilius, and Ancus Mareius were the first and third Latin, the second and fourth Sabine, the little king's second name; the legendary names; the warrior chief Romulus typified by his Roma quadrata and Comitium or place of assembly in the Forum; the priestly Numa by his Temple of Vesta and his Regia close to it; the statesman
Tullus Hostilius by his Senate House (Curia Hostilia); and the administrator Ancus Marcus by his state-prison, his bridge across the Tiber, his fortification of the Janiculum, and his founding of the seaport Ostia. In Tarquinius Priscus (616–578 B.C.) we have an Etruscan and less shadowy hero. Tarquin, son of the Senate, buiten from conquered Latin states, and laying out the Circus Maximus for the entertainment of the people. Servius Tullius, on Tarquin's initiative, distributed all freeholders (for military purposes primarily) into tribes, classes, and centuries. Until his death, Tullius, who lived to the age of one hundred in front were composed of the wealthier citizens as better able to equip themselves for attack; behind them came the centuries of the second and third classes, poorer and less fully appointed—the three forming the heavy-armed infantry; while centuries of the fourth and fifth classes, poorer still and correspondingly equipped, held the rear. The full strength of the freeholders was divided into two equal parts—the seniores and the juniors, the latter engaged in agriculture. A member of the centuriata consisted of 85 centuries or 8300 men—i.e. of two legions, each about 4200 strong, auxiliary to which were the sappers and trumpeters. Finally, the six centuries of cavalry were supplemented, from the wealthiest citizens, by twelve more. For the service of the army were again divided from him into four regions, corresponding to his four tribes, the Suburan, the Palatine, the Esquiline, and the Colline. These tribes included freeholders outside the gates, also entitled to meet and vote with the centuries at their comitia (comitia centuriata). Under her seventh and last king Rome became formidable throughout Central Italy, and owed to him the Temple of Jupiter Capitolinus, and the Cloaca Maxima—the drainage system tapping the hills around the Forum and carrying the waste into the Tiber. But Tarquin's rule was so masterful as to drive the people revolt, the last devastation being his son's outrage on the noble Lucretia. When engaged at a siege near the coast he was dethroned; he and his race were exiled in perpetuity, and regal government replaced by the Republican. To reinstate him were defeated, and he died at Cumae.

The Republic.—The regal check on them withdrawn, the patricians made their power so felt by the plebeians as to start a conflict between them lasting two hundred years. The king was now military capacity two consuls, elected annually, and from the patrician order. The plebeians, born of citizens as they were, retained their votes by classes at the comitia curiata and by centuries at the comitia centuriata, but many of them were attached as clients to patricians who commanded their votes and all of them were excluded from the higher offices of state. Unable to elect one of themselves consul, the plebeians had not even the power to carry the patrician candidate they favoured, being in a minority in the comitia centuriata, and, again, in the more immediate and decisive assembly, the comitia curiata. The absolute authority wielded by the consuls they felt to be still more oppressive when, in state crises, it was merged in a dictator; so their first attempt to safeguard their liberties and rights to elective control of the consul was an attack. The first advantage they gained was the 'right of appeal,' by which no magistrate (the dictator excepted) could subject a Roman citizen to capital punishment unless with approval of the comitia centuriata. Power to exact such rigours from the military capacity, raising, as soldiers, to serve unless their demands were conceded. The secession of their legions to the Mons Sacer, on the

Anio three miles off, secured them annually elected magistrates of their own, tribuni plebis, with power to protect them against the consuls. From two the tribunes were increased to five, and by 449 B.C. to ten. In a sense a magistrate, the tribune was a check on authority, and his power developed gradually till the tribunate, formidable at the close of the Republic, became still more so under the empire. By the Publilian law (471 B.C.) the assemblies convened by the tribune (comitia plebis) were made legal; not yet their decisions (plebiscita). At these the voting was by tribes, each by its own presiding officer. The effect of the tribunes was to add as many as possible to become member of a tribe it was necessary to be a freeholder, and so the tribunes, to multiply freeholders, agitated to secure for the plebeians their share of the agri publici or state-land. Of these partially succeeded this, they won another advantage from the ever-resisting patricians—the appointment for one year of a commission of ten patricians (decemviri) to make public a code of law binding on patrician equally with plebeian, the Twelve Tables—substituted written and published law, in place of the unwritten code, confined to the patrician few, was always interpreted in their interests. An attempt to reappoint, possibly to perpetuate, the decemvirs caused another secession; the consuls were again expelled from the state. The ground of their comitia, increased by accessions to the plebeian order from without, the tribunes extended the recognition of the plebiscita as legally binding on patricians. The comitia, now become comitia tributa, could henceforth carry reforms which, if sanctioned by the patres, had the validity of state-law. Another concession gained was intermarriage between plebeian and patrician, and thereafter the consulate—still the patrician stronghold—was attacked. The two consuls were replaced by six military tribunes drawn from either order. Of these partially succeeded this, the plebeians generally had the majority until, obstacles and delays notwithstanding, the Licinian and Sextian laws were passed (367) replacing the consular tribunes by consuls, two in number, of whom one at least should come from the plebeian college and at least one from another college from two to ten functionaries, of whom plebeians were to constitute half; relieving the poorer plebeians from debt; and promoting their interests by advantageous reforms in the ownership and cultivation of land. Patrician monopolies shrink rapidly. In 236 the dictatorship, in 350 the censorship, in 337 the pretorship, and in 300 the colleges of pontiffs and augurs were thrown open to plebeians. The potestas auctoritas, or control by patricians of the decrees (plebiscita) of the people in assembly, became a dead letter; and the two hundred years' conflict issues in the recognised validity of all measures carried in the comitia tributa—a conflict memorable not only for the ability displayed by either order, but for the respect for law observed equally by both. For her first fifty years of republican life Rome expanded little. Nearest her were the Latins, the Volscians to the south-east, the Equians to the east, and the Hernicans between the two last. Allying herself with the Latins and Hernicans, she held the south, she kept the city, she riveted her hold on south Etruria, and her policy became triumphantly aggressive in the sixty years between 449 and 390. Having razed the south Etruscan stronghold, Veii, she pushed northward to the Ciminnie forest, whence she drew down on her the Celtic conquerors of north Etruria, who, defeated, scattered in the north, the city, all the capital. Recovering rapidly from this disaster, she riveted her hold on south Etruria, gradually subjugated her old enemies and
Following up this advantage, she transferred the war to Africa, and was at first so successful as to recall a considerable part of her forces. But her consul Quinctius, whom she left behind, was worsted and almost completely defeated by Hamilcar at the battle of Ticinus, in 247 B.C. The Carthaginian general, having thus gained a temporary advantage, returned to Africa, where he speedily made preparations for another invasion. In 241 B.C. he again crossed the narrow strait, and captured the island of Sicily, which he had been so fortunate as to obtain from the Romans. But he was not long in the island before he was advised of the death of his master, and the invasion of Italy by his brother Hannibal. On this information, he immediately returned to Africa, and concentrated his forces, consisting of an army of 30,000 foot and 5000 horse, and an fleet of 250 galleys, under the command of his son Hasdrubal, with the view of extirpating Rome once more.
of Italy, to reinforce Hannibal in the south. But he was beaten and killed on the Metaurus by Nero, who, turning southwards, marched up to Hannibal's camp and threw Hasdrubal's head into it. The war in Italy was virtually at an end. Hannibal's attempt on Rome had failed. Meanwhile young Publius Scipio, having driven the Carthaginians from Spain, returned to the city with the proposal to descend on Carthage herself. The senate, not without hesitation, acceded. The success in Africa compelled Hannibal to leave his vantage ground in Southern Italy and come to the aid of his hard-pressed compatriots. The great battle at Zama left Scipio the victor, Hannibal a fugitive, and Carthage snaring for peace. Her request was granted, and she retained her territory, but bound herself to undertake no wars outside Africa and (without the consent of Rome) no wars inside. She surrendered nearly all her navy and had to pay an indemnity of 10,000 talents in fifty years. Rome was now (202 B.C.) mistress of the Mediterranean, but she had to consolidate her acquisition. Sicily, easily ruled under a pretor, became her granary and the provision store for her legions. Spain, however, required pretors invested with consular power and a permanent garrison of four legions to keep the enemy's foot soldiers from menacing it. This lasted till the fall of Numantia after a memorable resistance; and not before Scipio Africanus the younger took it in hand could the country really be called pacified and its rich resources made available. Meanwhile Rome had a secret dread of the resuscitation of Carthage, and she had prepared every pretext for renewing war with her and razing her to the ground. That came in 151 when Carthage, goaded by Masinissa's forays, broke her treaty obligations to punish him. In 149 Rome had sleig to her, and by 146 she was stamped out of the role of great cities. Her territory was doubled. It was protected by Masinissa's three sons, who ruled Numidia. In Italy herself the cities that had declared for Hannibal were severely punished. In the north the Celts forfeited their separate political existence. In the south Roman settlers occupied confiscated lands—nearly everywhere but in Apulia and Lucania; and even the Latins soon felt the preponderance of the Roman element, which tended more and more to assert itself.

Fifty years after she became mistress of the world Rome was the mightiest state in the east, first by conquering Philip of Macedon, who had been the ally of Hannibal, and whose ambition to dominate the Aegean drew Rome into the second Macedonian war (200), which ended in Philip's defeat at Cynoscephalae and the reduction of Macedon to a minor power. Next came the 'liberation of Greece,' which, with the alliance that followed, enabled Rome to proceed against Antiochus, king of Syria, who in 197-196 had overrun Asia Minor and penetrated into Thrace. As she had made her entrance into Asia Minor at a decisive defeat at Magnesia in Asia Minor, and fell back behind the Halys and Taurus range, to the west of which all the kingdoms and communities were now under Rome's protection. Western Greece, however, began to give trouble, and the Greek states till the whole peninsula was subdued to Rome. Steadily strengthening her hold on Asia Minor, Rome further assumed the guardianship of the king of Syria; while in Egypt, which in 168 had acknowledged her suzerainty, she restored a protector of hers to the throne, at the same time, true to her policy, dividing and weakening his power. From Syria to Spain the Mediterranean was now a Roman lake, but her authority was better established in the west than in the east. In the Orient her Novial government was fairly established; not so in the latter, which, besides its more elastic frontier, possessed a civilisation in some respects superior to her own.

With the establishment of her supremacy without bloodshed Rome was already beset by a new menace. The plebeian (mobales) combined with the old patrician families (optimates) to exclude all but themselves from high office or the senate. The constitution had become an oligarchy in which the comitia, nominally supreme in electing magistrates and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes. The prestige of having saved Rome from Hannibal and raised her to undisputed empire belonged to the aristocratic senate, while the graver disasters (at Trasimene and Cannae) were due to the people's favourites. But that prestige was getting gradually impaired by economic failure at home and confusion abroad, and the people were awakening to a sense of the power the senate had taken from them. The small holders, particularly in Etruria and South Italy, burdened with military service and passing laws, were practically supersedes.
became urgent. The Italian communities—the allies of Rome—had long felt their burdens increase as their privileges waned, and they demanded their share of the conquests they had helped to achieve. Promises of relief and expectation of securing the Italian provinces had brought Drusus in crowds to the capital, to be driven back again by an exclusive senate and people. The tribune Drusus strove to bring about fiscal reform and the redress of the Italians, but though he carried his laws he could not make them valid, and finally he was assassinated. The private grievances and resentments which the murder of Drusus roused the irritated Italians to rebellion (79–80) in the central highlands and the south especially. The Social War began, the insurgents aiming at the creation of a new Italian state governed on the lines of the Roman constitution. To suppress them the two consuls of the year, each with five legates, including Marius and his future rival Sulla, headed the legions, but were disastrously beaten. In the north, however, Marius and Sulla, and in Campania the consul Caesar, were partially victorious, but so partially that the reform had to be left to the Italians could obtain the franchise merely for the asking. The war at length died out by the absorption of the insurgents into the Roman citizenship; but the internal troubles continued. The new citizens enlarged their political claims, the secessions increased by personal feuds, economic distress prevailed among all, and a war with Mithridates threw Marius and Sulla into rivalry as to which should command the expeditionary force. The action of the tribune Fulvius in dealing with this complicated crisis intensified it the more. He was sent to the East on a Mithridatic campaign, to allow the new citizens to vote in all, not in a restricted, number of tribes, to confine the freedmen to the four urban tribes no longer, to unseat any senator more than 2000 denari in debt, to recall from exile those suspected of complicity with the Italian insurgents. Every one of these proposals, bitterly contested, would yet have become law but for the consul Sulla, who, heading in Campania the legions assigned him in the Social War, marched on Rome—the first consul who ever in his own city. Marius and Sulla left him free to impose arbitrary measures, among them that by which the sanction of the senate was required before any bill could be entertained by the comitia; and, having seen the consular elections safely through, he set out against Mithridates (78).

In his absence Cinna attempted as consul to carry the reforms of Sulpicius, but was driven from Rome amid the massacre of the new citizens in voting assembly. He in turn rallied round him the legions in Campania, and joined by the veteran Marius, who, returned from Africa, he entered Rome and was recognised as consul, as was Marius himself (for the seventh time). After a brutally vindictive massacre Marius died (78), and Cinna remained supreme, securing the consulsight to himself and a confereate, and getting the newly-enfranchised tribes enrolled. In 74 he died, and next year Sulla, having concluded a peace with Mithridates and left Asia tranquil, landed at Brundisium with a powerful army, including many of the nobles who had fled from Cinna. Resistance, nowhere formidable, he quickly overthrew. The triumphs of Sulla followed. He received Mithridates triumphant in North Italy and to annihilate the remnants of the Marian party just outside the city. But he failed to use his power, absolute as it was, for the abatement of long-standing evils and the prevention of coming disasters. Triumphant everywhere, he instituted a reign of terror—slaying, proscribing, and confiscating through revenge of suspicion. For nine years his rule as dictator, in spite of much salutary administration, was marred by a remorseless partisanship which left the future to take care of itself—creating in the sons and heirs of the proscribed and dispossessed the handy tools of agitation, justified as this increasing by the ruined agriculture, by the multiplying of latifundia with their necessary evictions, and by the rapid disappearance from near all Italy of her substantial freeholders. Life and property, already widely forfeited at his bidding, were still further diminished for the sake of need, and the combination of the formidable rising of Spartacus, who held out for two years (73–71). Still fortifying the senate, Sulla left the tribunes with no power of interdict save in protecting individual plebeians, and he excluded them from ever holding high office; he took from the equestrians the control of the courts, giving it back to the senate, to which he also restored its exclusive rights in the colleges of pontiffs and augurs. He extended the application of the criminal law—a wise measure; but he did more than any Roman before him to facilitate the rise to supremacy of a body of noble leaders, but of mere vince or leader of a provincial army. He forged in fact the weapon by which his system fell (70).

In Spain Cneius Pompey, one of Sulla's favorites, held a commission from the senate to crush the Marian governor Sertorius, who had defeated successive consuls and equestrians in his province; the submission of the natives following the murder of Sertorius he returned to Rome, and found the opposition to Sulla looking out for a leader to effect a change of government. His ambition to have a triumph, to be made consul for next year (70), and by conquests to obtain command of the army, was gratified for the sake of his name and influence. He was elected consul with Crassus, the victor over Spartacus, their troops being just outside the gates, and on the triumph and ovation granted to the two generals ensued Pompey's fulfillment of the bargain—the reinstatement of the tribunes in their authority and of the equestrians in the courts, and the weeding out from the senate of Sulla's notorious tools. The example set by Sulla was improved upon, and henceforth the republican constitution was the shield of the strongest leader. Pompey's next move was to obtain command abroad, and after some delay this was found in a mission to clear the Mediterranean of pirates. For this formidable undertaking the tribune Gabinius secured him large powers, tenable for three years, including motion of public works and entertainments, to live and register in the Mediterranean provinces for fifty miles inland. These, backed by a splendid fleet and army, were yet further enhanced by the tribute Manlius, who got Pompey entrusted with the campaign against Mithridates and with the charge of Roman interests in the east. The wiser senators gave ominous warning against these measures, but were powerless against tribunes and people, seconded by equestrians, who as the commercial class drew much of their wealth from Asia. So Pompey set out in 67. Meanwhile Cicero, as consul, extorted from the tribune Pansa an order from his own great contemporary, Cinna, who was also the nephew of Marius and son-in-law of Cinna, and whose consummate ability, shown in the revindication of the tribunate and the carrying of the measures in support of Pompey, had full scope now that Pompey's back was turned. He declared the peace treaties, and fingering the injured names of Marius, Cinna, and Sertorius, pleading for the children of the proscribed, and bringing Sulla's headsemen to justice.

Rising in popular favour by his efforts to enfranchise the Transpadane Latins and his munificent promises of works and entertainments, he spared no means, constitutional or the
reverse, to put himself on even terms with Pompey before that magnate’s return. Crassus, the millionaire, he found a tractable auxiliary, in concert with whom he was rapidly gaining powers hardly inferior to Pompey’s, when the Catilinarian conspiracy came out. Pompey, Cæsar, and Cæsar’s friends, as consuls, involved Cæsar in the ill-will in which the middle classes held popular adventurers. Pompey had now returned to importune the senate for the ratification of his measures in Asia and the bestowal of land on his legions. His demands were met with determined opposition, till Cæsar, pistols as his friend, formed with him and Crassus the coalition—the first, if irregular, triumvirate—of which Pompey was the head, Cæsar engaging to see Pompey satisfied, and Pompey in return promising Cæsar’s candidature for the consulship. Cicero strove to undo a coalition he knew to be fatal to his ideal of a conservative republic, but in vain; he saw the senate weakened by a quarrel with the equestrians and its authority impugned by the friends of Catiline, who armagged him for having rejected the senate’s approval, violated the law in putting to death the conspirator’s lieutenants. The triumvirate in 59 fulfilled its compact. Cæsar obtained the consulsip and the satisfaction of Pompey’s demands, conciliated the equestrians at the expense of the senate, and carrying on the bills of days and the tribunals as a reward his faithful friends. But his crowning success was his obtaining for five years the military command of Cisalpine Gaul, Illyricum, and later of Transalpine Gaul, from which he could scan every political move in Italy. The next year (58) Cæsus, the tribune, proceeded against Cicero, who, thrown over by Pompey and with Cæsar out of reach, fled from Rome and was outlawed—to be recalled (57), and his outlawry annulled by senate and people, in the reaction induced by Cæsar’s misdeeds. Cicero, to fortify the constitution, renewed his efforts, only to fail and retire from public life. The triumvirs tightened their alliance. Cæsar secured his command for five years more; Pompey and Crassus were elected consuls, and Pompey received as province the two Spain’s, with Africa, and one year the province of Asia, at the mercy of all three, not, however, for long. Cæsar was defeated and killed by the Parthians (53), and Pompey was slowly but surely drawn into antagonism with Cæsar. Rome, in the absence of Cæsar, was harassed by deadly turmoil till the senate in despair induced Pompey to remain in Italy, electing him sole consul (52), giving him, with fresh legions, five years’ more command, and, in fact, pitting him as its champion against Cæsar. It tried to reduce Cæsar to impotence, either by keeping him at his post, and so baulking his candidature for the consulship, which required his presence in the capital, or, by terminating his command at its legal expiry, to detach him from his troops and make him pursue his candidature in Rome as a private citizen. Negotiations being unsuccessful, the senate only left the latter more unpromising; and with well-inspired audacity he crossed the Rubicon (49) and advanced on the city. Unprepared for such a move, Pompey and most of the senatorial party, including the consuls and many nobles, withdrew to Greece, leaving Cæsar to enter Rome in triumph. The mighty duel between the two chiefs had begun. After a brief pause Cæsar hurried to Spain, and, victorious over the powerful armies of Pompey’s legates, returned to Rome, where, appointed (48) dictator in his absence, he almost immediately renounced the post, and as consul for 48 crossed over into Greece and dealt Pompey a crushing blow at Pharsalus. The Pompeian cause struggled on till 45, when it collapsed at Munda, and Cæsar was made by the senate dictator for life. Unlike Sulla, he used his power with a clemency, a statesman-like wisdom, and a patriotism that made men almost forgive, if not forget, how he came by it. The roll of his salutary reforms and innovations included Cæsar, Cicero’s, as consul, involved Cæsar in the ill-will in which the middle classes held popular adventurers.

The Empire.—Augustus began (28–27 B.C.) by a restoration of the republic, with himself as princeps, the republican constitution being retained, while the principal head of the state and the principal source of authority which had been in the hands of Caesar was assigned to a princeps. This was done by a decree of the Senate, which gave him the title of Augustus, in token of supreme dignity, the cognomen 'Augustus,' and also the procureuscire imperium, which far exceeded the old proconsular command in width of area and length of tenure, the provinces being governed by legates appointed by him. At the head of army and navy he was commander-in-chief, raising or dissolving both, and declaring or concluding war at pleasure. His imperium, contrary to precedent, he was allowed to retain within the proconsular imperium, and he consigned him there the power wielded by a proconsul in his province. Augustus refrained from exercising this in Rome, but as tribune of the people he controlled the entire administrative machine, so that, what with proconsular command and the tribunicia
potestas, he possessed powers which made all others of them. Henceforth, he was the head of religion as pontifex maximus, and from time to time he had privileges and exemptions decreed by the senate. Anxious as he was to retain the outward show of republican institutions, they declined under the weight of his personal influence. Vitellius, the last Flavian to attempt to enshrine the name of the Flavians in senatorial immortality, was succeeded by Otho, whose name became a synonym for the enmity of the pretorians, who killed him in the interests of Otho (69), now proclaimed emperor. But the legions on the German frontier preferred their own general, Vespasian (69). Otho, defeated at the head of his pretorians, committed suicide. He had been born to a humble family and from his564 youth had been destined to be murdered after being disavowed by the army in Syria, who proclaimed their commander, Vespasian. With him began the Flavian (69-96), strong and beneficent emperors, save one. Vespasian (96-79) disinherited the divine attributes of the Flavian gens, and established the claim of his predecessor, and not only returned to the simpler life and more modest court of early imperial days, but tried to resuscitate the authority of the senate, and even ostentatiously to keep himself within the law and to promote the welfare of the people.Titus (79-81) improved on this sound policy, while providing public baths and the amusements of the Colosseum; but his brother Domitian (81-96) became infamous for profligacy and cruelty, popular only with the worst of his pretorians. Nerva (96-98) was restoring the best traditions of the Augustan age; Trajan (98-117) was not murdered by the pretorians, impatient of his austerities—not, however, before he had adopted as son and successor Trajan (98-117), commanding on the Rhine. The assumption of empire by a born provincial illustrates the gradual weakening of Rome's connection with her rulers, whose semi-legislative government became really the military headquarters for the time being. He and the following three emperors gave Rome a century of beneficent rule—the happiest hundred years yet known to her. Living like a plain soldier, he conscripted the senate house for his headquarters and made official his corresponding advances in civilization and prosperity. With the establishment of the imperial system the fortunes of Rome are reflected in those of her emperors, to narrate which would be to repeat the biographies given elsewhere. Henceforth we have but to deal with epoch-making events. Tiberius (14-37 A.D.) had little of his predecessor's esteem, genuine or assumed, for republican institutions. The senate became more of an imperial tool, all power more and more embodied in the princeps. The simple noble of life affected by Augustus was replaced by his, a career composed of more and more palatial residences, in the bodyguards, the courtiers, the aulic etiquette subsequently carried to unheard-of lengths. The population of Rome, from the highest to the humblest, deteriorated—a wealthy, indolent, luxurious upper class maintaining mobs of dependents, below whom was the proletariat, which the emperor from time to time provisioned and armed. Secure against public opinion, Tiberius relied on the military arm, and in Rome herself had his proctorian guard, some 6000 strong, within reach. These troops acquired a power which overshadowed all others; the emperor became more and more dependent on them. Caligula (37-41) did much to show with what depravity the imperial system was compatible, and in the succeeding reigns of Claudius (41-54) and of Nero (54-68) could generate had further illustration. The former, noble emperor by the pretorians in defiance of the senate, was the creature of profligate and scheming wits, the second of whom poisoned him; the latter perpetrated every crime or excess within his power, till suicide, the ultimate ignominy, fell on the joy of Romans, provincials, and of the whole empire itself. Like his two predecessors he had first been hailed by the soldiers as emperor, and thereafter invested with power by the senate; but with him the succession from Augustus expired; and whom to replace him by was the question. Galba (69), with the nomination of some, unlike those of the ennui of the pretorians, who killed him in the interests of Otho (69), now proclaimed emperor. But the legions on the German frontier preferred their own general, Vespasian (69). Otho, defeated at the head of his pretorians, committed suicide. He had been born to a humble family and from his564 youth had been destined to be murdered after being disavowed by the army in Syria, who proclaimed their commander, Vespasian. With him began the Flavian (69-96), strong and beneficent emperors, save one. Vespasian (96-79) disinherited the divine attributes of the Flavian gens, and established the claim of his predecessor, and not only returned to the simpler life and more modest court of early imperial days, but tried to resuscitate the authority of the senate, and even ostentatiously to keep himself within the law and to promote the welfare of the people. Titus (79-81) improved on this sound policy, while providing public baths and the amusements of the Colosseum; but his brother Domitian (81-96) became infamous for profligacy and cruelty, popular only with the worst of his pretorians. Nerva (96-98) was restoring the best traditions of the Augustan age; Trajan (98-117) was not murdered by the pretorians, impatient of his austerities—not, however, before he had adopted as son and successor Trajan (98-117), commanding on the Rhine. The assumption of empire by a born provincial illustrates the gradual weakening of Rome's connection with her rulers, whose semi-legislative government became really the military headquarters for the time being. He and the following three emperors gave Rome a century of beneficent rule—the happiest hundred years yet known to her. Living like a plain soldier, he conscripted the senate house for his headquarters and made official his corresponding advances in civilization and prosperity. With the establishment of the imperial system the fortunes of Rome are reflected in those of her emperors, to narrate which would be to repeat the biographies given elsewhere. Henceforth we have but to deal with epoch-making events. Tiberius (14-37 A.D.) had little of his predecessor's esteem, genuine or assumed, for republican institutions. The senate became more of an imperial tool, all power more and more embodied in the princeps. The simple noble of life affected by Augustus was replaced by his, a career composed of more and more palatial residences, in the bodyguards, the courtiers, the aulic etiquette subsequently carried to unheard-of lengths. The population of Rome, from the highest to the humblest, deteriorated—a wealthy, indolent, luxurious upper class maintaining mobs of dependents, below whom was the proletariat, which the emperor from time to time provisioned and armed. Secure against public opinion, Tiberius relied on the military arm, and in Rome herself had his proctorian guard, some 6000 strong, within reach. These troops acquired a power which overshadowed all others; the emperor became more and more dependent on them. Caligula (37-41) did much to show with what depravity the imperial system was compatible, and in the succeeding reigns of Claudius (41-54) and of Nero (54-68) could generate had further illustration. The former, noble emperor by the pretorians in defiance of the senate, was the creature of profligate and scheming wits, the second of whom poisoned him; the latter perpetrated every crime or excess within his power, till suicide, the ultimate ignominy, fell on the joy of Romans, provincials, and of the whole empire itself. Like his two predecessors he had first been hailed by the soldiers as emperor, and thereafter invested with power by the senate; but with him the succession from Augustus expired; and whom
paid by Rome, gave the rights of citizenship to the former, thus equalising all and unifying the empire. His brutal personality has no further interest for us; the more than that of his fifteen successors, nearly all of whom came by death, generally, at the hands of the soldiers who had set them up. For them the dreary *Augustan History*, or its vivid condensation by Gibbon, must suffice, with our own articles on Heligoland, Severus, the three Gordians, Galba, and Gallienus. They left the Roman empire week by week, everywhere exposed to the Franks on the Rhine and the Goths on the Danube. The former ravaged Gaul and Spain, the latter Asia Minor and Greece, while the Persians, relieved of the Parthian yoke, had again become a formidable power in the east. In Rome and throughout Italy anarchy and distress prevailed till a temporary revival was brought about by the *Illyrian emperors*—Claudius (268–270) driving back the Goths, and the yet abler Aurelianus (270–275), by his victories over Goths and Germans and his successes in the east and west, restoring the lustre of the Roman arms, and, for a brief space, the unity of the empire.

Dioecletian (284–305), also an Illyrian, the next great name on the imperial roll, introduced a system of partition and administration akin and aggregate from without. He assumed that his first and greatest colleague he could find to share with him the government of the empire. This was Maximian, who, like himself, took the title of Augustus. He further reinforced this dual control by associating with him Gallic and Oriental able generals, like Maximian, whom he proclaimed as *Caesares*, below the two *Augusti* in rank, but with the right of succession to these. He himself had Thrace, Egypt, and Asia under him; to Maximian he gave Italy and Africa, to Constantius Gaul, Spain, and Britain. Thus internal sedition was suppressed within the empire, and, this distraction removed, the frontier fortifications could be perfected. The Rhine, the Danube, and the Persian boundary were garrisoned at frequent intervals and the barbarians kept in check, while all temptation of the soldiers to rebellion was overawed by the repressive measures at the command of the four rulers acting in concert. Rome now ceased to be the one capital. If she remained a capital, it was as the seat of a nominal senate and an inveterate court of last resort. He set up his headquarters, Dioecletian at Nicomedia, Maximian at Milan, Constantius at Treves, Galerius at Sirmium. This was a momentous departure from the tradition by which the emperors had claimed to be but the supreme magistrates of the city and the chiefs of her armies. Rome indeed was less imperial than any town in which the emperor chose to live. The policy of keeping the soldiery estranged from the emperor's presence took the form of increased dignity in his demeanour and model of life. He was the most experienced, by Aurelian reaching extravagant lengths in Dioecletian. He reorganised the services, civil and military, under new titles, which came to be more valued than the republican consuls or senator, and typified the completely autocratic power he assumed. He was a dispensing of death, wealth, and power effectively: but after twenty-one years, and in breaking health, he abdicated publicly the power he felt incapable of wielding. His masterful personality no longer felt, rupture between *Caesares* and *Augusti* ended in civil wars, the theme of which was the Cesar Constantius Constantine, who had himself become Caesar of the army in Britain, overcame all rivalry, and in 323 ruled the empire single-handed. Christianity, since its rise under Augustus and its spread under Tiberius and the later emperors, had triumphed over the last attempt under Dioecletian to crush it by persecution, and the politic Constantine, adopting it as his own religion, made it also the state's. To the toting imperial fabric it brought new strength, armed with which he proceeded to develop Dioecletian's policy of religion, Constantine, commanding by its position the Greek and Asiatic worlds. Remodelling Rome's traditional institutions, he made a new senate, with a large infusion of Greeks, all of his own choosing: he instituted a new *prefectus urbi*, and founded in the 'Rome on the Bosporus', an absolute monarchy. Reducing the number of soldiers under each general, he weakened the army's power to revolt by dispersing it among small garrisons in the cities, the other for the frontiers. The same subdividing process he carried into the provinces, splitting them up into districts, which again he rearranged into thirteen larger ones, subject to four prefects, responsible in their turn to the emperor. Multiplying officials who owed everything to him, he made them the nucleus of a new nobility, to supersede the old, and to find their interest in perpetuating his power. These sagacious measures, coupled with the prestige of the new religion, reinforced the army greatly; the taxation seemed to prove it an easier path to happiness. The costly court and the highly paid officials drained the treasury, which had to be replenished by extortions from the people, who met them from the proceeds of the land they tilled. The forays of the barbarians, increasing in number and range, steadily reduced the means of these small holders, who thus, except in profound peace, could not satisfy the tax-gatherers. Farms disappeared, not to be replaced, and unproductive waste-lands encroached more and more within the frontier. The death of Constantine in 337, and the civil war among the rival Caesars, till Constantine's only surviving son, Constantius II. (331–361), succeeded in uniting the empire under the same house. Not without misgiving he made a 'Cesar' of his cousin Julian and entrusted him with Gaul, where Julian's success was such as to rouse his jealousy. Constantius accordingly commanded his cousin's legions to start for Persia; but instead of complying they proclaimed Julian emperor and Augustus. Conclusions died soon after, and an inevitable conflict was set on foot. Julian has the interests us more by his defence of the Rhine frontier and his Persian campaign than by his 'apostasy' from Christianity. He succeeded in staying off the barbarian inroads on the western provinces; but his diversion in favour of the 'cruel outworn' did not survive his last encounter on the Tigris, where he was killed. Jovian, who succeeded him on the battlefield, outlived him a few months, and Valentinian I. (364–375), the next emperor, at the instance of the army which had proclaimed him, left as his colleague his brother Valens, whom he made emperor of the east. For ten years the dual government prevailed, and the barbarians were kept in check at the Rhine and Danube, but his death found Valens unequal to his post. The Goths, gored by the Huns in the year, had the opportunity of putting to rout a majority of their imperial neighbours, but were so harshly treated that they turned on them and killed Valens in battle (378). They threatened Constantine, but the next emperor, Theodosins (379–395), made no attempt to develop Dioecletian's policy of religion, 368; so that he was able to keep on the throne his colleague of the west, the feeble Gratian. That emperor was murdered (383) by Maxiinus, whom Theodosins recognised as Caesar and left in command of Gaul, Spain, and Britain, till Maximus (386), worsted by Theodosins in his attempt on Italy and
Henry IV., the short rule of Rienzi (q.v.), the sack in 1527 by the Constable de Bourbon (q.v.), the Napoléon of 1804 and the Dutch and later the re-establishment in 1870 of Rome as capital of Italy. The history of the Eastern Empire is given at BYZANTINE EMPIRE.

Rome Prehistoric, Legat, and Republican: Gibb's Geschichte und Topographie der Stadt Rom im Altertum (1883–95); and well known is Toulouze's De la religion de l'Antiquité; and the work of Mr. Arnold aung in the London Imperial: Gardthausen's Augustus und seine Zeit (first part 1891); Mommsen's fifth volume (Eng. trans. 1887); Merivale; Gibbon (endowing most of what is valuable in Tillemont); Herman Schiller's Geschichte der Kaiserzeit; and Reumont; Gaston Boissier's Le Fin du Paganisme (2 vols. 1891); Halsking's Italy and her Invaders (1850–51); Professor Pelham in the Encyclopaedia Britannica; Bury, History of the Roman Empire (1893); Stockham, History of Rome (1894); and the general histories of Rome by Schmitz, Liddell, Merivale, Gillman, and Pelham, as well as a serviceable abridgment of Mommsen. Rome Medieval: Gregorovius's Geschichte der Stadt (Eng. trans. 1895); Von Reumont; Hanne's History of the Popes; Siamoni, Abbatita L'Italia nel Medio Evo (1891); and the church histories of Barozini, Robertson, and Milman; Milman; and Dyce, History of the City of Rome (2d ed. 1883); Graf, Roma nella Memoria del Medio Evo (1882–83); Lucchini, Pagan and Christian Rome (1893); and Burn, Ancient Rome and its Neighbourhood (1895); and see Cerrioli's Bibliografia di Roma (1893) and Villari's 'Rome Medieval and Modern' in the Encyclopaedia Britannica. Becker's Gallus, Lockhart's Valerius, Graham's Neron, Westbury's Acte, and Wiseman's Fabiola are works of fiction dealing learnedly and affectionately with the history and life.

RELIGION.—The religion of ancient Rome was in practice and theory almost always a polytheistic one. So accounts for the ease with which in later times two religions became blended. Rome's earliest occupants, the Latins and the Sabines, had, like the Greeks themselves, a Pelagie progeniture, and the greater number of their divinities were ultimately descended, through the Latin and Sabine, from Pelagie originals. The Etruscan infusion into Roman nationality affected religion mainly on its external side, that of ceremonial. Among these Italian races—Latin, Sabine, Etruscan—religion took an Italian development, redolent of their racial and geographical surroundings, and when compared with the Greeks, lack of creative power was one; hence we miss in the Roman divine world that wealth of legend which makes the Greek so picturesque, while from the same cause the Roman divinities betray fewer of the failings by which those of Greece often sink to the human level. The Roman genius, with its practical and objective turn, determined the more observant spirit of its religions worship, which in its minute attention to detail, both in word and act, implied a graver, more reverential notion of deity. Sprung from shepherd stock, attuned to the rhythm of pastoral, agrarian, patriarchal type, the early Romans strike a rural and domestic note in their religion, worshipping especially the gods of nature, of field and forest, the bounteous protectors of flocks, or donors of harvests, like Fauns, Vertumnus, Saturn, Ops, and the like. In the family, the social unit, gods of the family (Lares and Penates). This worship long retained in Rome the rural and household traits of its original inspiration, and far down in the history of the empire we find numerous festivities antique as to observance and yearly as to recurrence, especially at the festivals of Bacchus and Silvanus, such like. Side by side with her agricultural, pastoral, and household divinities Rome from the earliest times continued to worship the deities who protected her civic life—state-deities, like her...
founder and maintainer, Jupiter. With her political growth these came more and more to the front. After Jupiter, the head of the divine world, comes Mars, the defender of the city, father of Romulus and of the Roman people, and Quirinus, the deified Roman! god, and in a way the god of the city. Juno was composed of Jupiter, with his sister and consort Juno and his daughter Minerva. Beside them in reverential honor was worshipped Vesta, goddess of the sacred fire and of the household hearth, while Mars, the groundwork of the state. The deities just mentioned, together with the protective or tutelary deities, formed the main body of the state-religion of the Romans—a state-religion of which their second king, the Sabine Numnah, was the revered founder and organizer. Of subordinate importance, but closely intertwined with public life and its concerns, came the worship of abstract, chiefly moral entities, embodied in the religious conception as Virtus, Fides, Fictas. Such deities gradually multiplied according to the appreciation or whim of individuals, till nearly every possible condition or influence, inclined the most to occur rences and agencies, even accidental phenomena, were endowed with divine being, and worshipped accordingly. So we find Orbana, the averter of bereavement and bringer of comfort to its victims, Pessava, the preserver from weariness, Quies, Febris, Advena, Aequora (the goddess invoked on departure and arrival). The natural world, the civic, the moral—the three elements above indicated—were the chief components of Rome’s religion, and during her supremacy constituted the pantheon jealously guarded by the state from every foreign contamination. But with the spread of her dominion, particularly on her coming into closer contact with the Greeks in lower Italy, she imported into her religion extraneous, mostly Greek, objects and modes of worship. She sought to early to revere the oracular Apollo of Delphi, and (422) erected in Rome a temple in his honour as the plague-averting deity. Castor and Pollux were another acclimatisation, and their temple to them dates from 304. The worship of Asclepius she took from Epidaurus (29). So long as her civilisation and national independence were kept up, foreign cult, though introduced and sanctioned by the state, as something separate from her old constitutional religion, which was thus maintained free from all corrupting or disintegrating infusion. So long as the second Punic war was, however, at that turning-point in her civilisation—in an incredibly short time she became penetrated by Greek influences, and threw wide the door to the mythological traditions of Greece. She did indeed retain, for the most part, the names she had given her gods and the rites by which she worshipped them; but these were gradually undermined and overthrown by Greek notions, until her literature, in so far as it dealt with religion, became impregnated with Greek legend and spirit. Nor was it Greece at her best that Rome followed in this subject to her gods. Greek influences parted with her better traditions, and could convey little but what was sceptical and frivolous of her own or what was superstitious and fleshly of her eastern neighbours. Asia and Egypt, through the inter- mission of Greece, and laterly of Gaul, became the source of a sombre, sensual, degrading cult, which Rome, professedly at least attached to her healthier, more masculine worship, strove fruitlessly to counteract. Augustus did his best to prop up the declining religion through restoration of old usages and festivals, the rebuilding of temples on a more magnificent scale, and the dis- comfiture of superstitious importations. Ovid made himself the poet of a similar inspiration in his Fasti, wherein he tried, by reviving the old forgotten ceremonial, to reawaken the spirit from which these had sprung. Later emperors interposed from time to time in the same cause; but in vain. Religion and morals deteriorated with a rapidity that helps to explain the steady, irresistible decline of that religion of which Rome became the seat.

The relocation in Rome of its history: Mommsen’s History of Rome; Fastel de Coulanges, La Cité Antique (1864); Bouche-Leclercq, Histoire de la Divination dans l’Antiquité (4 vols., 1879-92); Roscher, Ausführ. Lexikon der Griech. u. Röm. Mythologie: and Gaston Buisson’s La Religion Romaine should be consulted for fuller information, and the excellent article in the Encyclopedia of the Kloss. The same; also Jean Reville, La Religion à Rome sous les Empire (1856).

On Rome, its history and antiquities, see also the articles in this work on Caesar, Augustus, and the great men of ancient Rome; those on the Roman gods; the maps of Italia Antiqua and Roman Empire; and the following articles:

Alphabet. Church History. Censorial.
Apothecaries. Church (States of the.
Art. Constitution.
Artillery. Dictator.
Arms. Divination.
Augsburg. Equestrian Order.
Baptha. Eunuch.
Byzantine Empire. Family. Eunuchus.
Canons of Amiens. Fama.
Canon Law. Fama.
Carthage. Feme.
Catacombs. Holy.

Rome, (1) capital of Floyd county, Georgia, on the Coosa river, 72 miles by rail NW of Atlanta. It has iron-foundries, and manufactories of ploughs, nails, &c., and ships cottens. Pop. (1880) 3877; (1900) 7291.—(2) A city of New York, on the Mohawk River, 10 miles by rail NW of Utica, and at the junction of the Erie and Black River canals. It contains a number of mills and manufactories of iron, brass, copper, and other goods. Here is Fort Stanwix, which was successfully defended against St Leger, and 6 miles to the southeast of Oriskany was fought, during the Revolution. Pop. (1890) 14,991; (1900) 15,345.

Rome, PRIX DE, the great prize given by the School of Fine Arts and the Conservatory in Paris, consists of a certain sum for four years, during which the recipient is expected to study painting at Rome and to lodge in the Villa Medici. The second prize is a gold medal.

Rome-scot, a name for Peter’s pence (q.v.).

Romford, a market-town of Essex, on the Bourne or Rom, 12 miles ENE of London. It has large cattle and corn markets, iron-foundries, extensive market-gardens, and a very large brewery of Romford ale. The church of St Edward the Confessor was rebuilt in 1850. Romford is the capital of the Liberty of Havering-atte-Bower, one of the parts of the lands of the Saxons kings. Pop. (1851) 3681; (1891) 8408. See George Terry’s Memories of Old Romford (1880).

Romilly, Sir Samuel, English lawyer and law reformer, was born son of a watchmaker of Huguenot descent, at London, March 1, 1757. At sixteen he was articled to one of the Chancery clerks, at twenty-one entered himself at Gray’s Inn, and afterwards went to the Midland Grenfell, but found his chief employment in Chancery practice. In 1784 he made the acquaintance of Mirabeau, who introduced him to Lord Lansdowne; in 1790 he published an able pamphlet on the French Revolution. In 1806 he was, at the instance of Mr Fox, appointed Solicitor-general in the Grenville administration, and was compelled to accept the honour of knighthood. He took his seat for Queenborough, as in later parliaments for Horsham, Wareham, and
Arundel. He now devoted himself, by pamphlets and oratory, to the abolition of the slave trade. He became one of the leaders in the House of Commons. In his last years he was deeply interested in the welfare of the poor and in educational and religious matters. He was a strong supporter of the English Constitution and a firm friend of the Whig party. He died in 1821, and his influence continued to be felt in the political life of the country for many years to come.

ROMNEY, 1784.

One of the most celebrated landscape painters of the 18th century, he was born in the county of Kent. His early training was in the studio of his father, a颇为出色的 portrait painter. Romney's landscapes are characterized by their准确性 and clarity of detail, and their strong emphasis on natural beauty. He was a great favourite with the aristocracy and was frequently commissioned to paint portraits of members of the royal family. He died in 1865, leaving behind a large body of work that continues to be admired today.

RONDEAU, 1774.

A French poet, he is best known for his collection of love poems, Les Fleurs du Mal, which was published in 1857. These poems are characterized by their intricate imagery and their exploration of themes such as love, death, and the natural world. Rondeau's works have had a profound influence on French literature and continue to be studied and appreciated today.

ROMNEY, NEW. A new borough and Cinque Port in the south of Kent, 8 miles SW. of Hythe. It ceased to be a port in the days of Edward, and is now not even on the sea-shore or on the coast.

ROMNEY, George, painter, 1734-1802. Born in Hampshire, he was educated at Trinity College, Cambridge, and became a lawyer. He was a prolific painter and his works are characterized by their accuracy and attention to detail. Romney's landscapes are particularly celebrated for their representation of the English countryside, and his portraits of the royal family are also highly admired. He died in 1802, leaving behind a large body of work that continues to be studied and appreciated today.

ROMSEY, 1791. A town of Hampshire, 9 miles NW. of Southampton. A fine church, the Caxton Abbey, founded by Richard Caxton, is a notable feature of the town. The church was founded in 1087 and is one of the oldest in England. It is characterized by its beautiful architecture and its significant role in the history of the country.

ROMY, 1802. A town in the district of Bordeaux, in the Gironde. It is a port and a centre of the wine trade. The town is famous for its produce, particularly its wine, which is highly regarded.

ROMY, 1852. A town in the department of Eure-et-Loir, in the region of Centre-Val de Loire. It is a centre of the wine trade and is known for its produce, particularly its wine, which is highly regarded.

ROMY, 1873. A town in the department of Indre-et-Loire, in the region of Centre-Val de Loire. It is a centre of the wine trade and is known for its produce, particularly its wine, which is highly regarded.
Rondo (Ital.), the most obvious and elementary form in music in which the first subject, clearly marked out, followed by other or lesser definite, recurs again in its original key. In later developments the repetition may take place twice, thrice, or even four times, sometimes in part only, or in modified form, the intervening sections being varied in different ways. A large proportion of songs and instrumental pieces are in this form: and the final movement of a sonata, symphony, or concerto is frequently a rondo.

Rondo, till 1872 a post-village of New York, with a pop. of 10,000; now part of Kingston (q.v.)

Ronge, Johann. See German Catholics.

Rousard, Pierre de, French poet, born at the Château de la Poissonnière in Vendôme, September 11, 1524, served the Dauphin and the Duc d'Orléans, and accompanied James V, with his bride, Marie de Lorraine, to Scotland, where he stayed three years. Becoming deaf, he abandoned arms for letters, and at the Collège Coqueret studied with Du Bellay and other members of the famous Pléiade. His Odes (1530) excited violent opposition; his Satires and Récits (1536) appeared his Amours and the fifth book of his Odes, his Hymne in 1555, in 1600 Œuvres Complètes, and in 1572, just after the St. Bartholomew massacre, La Franciade, a fragment of an epic. Charles IX. heaped favours upon the lucky poet, who spent his later years with his friend Anne of Austria in Croisy; Val in Vendôme. He died at his priory of St. Cosme at Tours, December 27, 1585.

See editions by Blanchenain (1857-67) and Marty-Levaux (1858-91); Sainte-Beuve's Œuvres choisies de Rousard (1826); and studies by Sechehée (1874), Chalançon (1875), Bisot (1891), and Pieri (1896).

Röntgen, Wilhelm Konrad von, physicist, born 27th March 1845 at Lennep in Rhenish Prussia, studied at Zurich, and became professor at Strasbourg, Giessen, and (1883) at Würzburg. He has contributed to science on specific lines in gases, elasticity, compressibility, capillarity, the absorption of heat in steam and gases, and especially the X-rays, usually called after him.

Röntgen rays, a peculiar kind of radiation discovered in 1895 by Professor Röntgen, and produced, with comparatively little effort, by a tube called a VACUUM TUBES (q.v.). They pass, with comparatively little absorption, through wood, flesh, paper, and other optically opaque substances, but are strongly absorbed by such substances as metals, bone, and glass. In a general way the 'transparency' of matter to these rays, all rays decreases as the density increases. Their presence is detected by their power of producing luminescence in certain fluorescent substances, such as the platino-cyanide of barium, sodium, or potassium (PHOSPHORESCENCE). A screen covered with a layer of these fluorescent crystals becomes brightly luminous in the neighbourhood of a vacuum tube which is giving out Röntgen rays. When a slab of wood or vulcanite is interposed between the vacuum tube and the screen, the screen still continues to glow. An arm interposed at right angles to the screen, a shadow of a hand, a shadow in the dark central bony structure can be clearly distinguished from the lighter flesh shadows. These shadow-pictures may also be photographed on a sensitive photographic film or plate, and a permanent record secured—an application of immense service to surgery.

It should be noted that there is nothing really extraordinary in optical opaque matter being transparent to other kinds of rays. A similar group of phenomena is met with in the opacity of glass and the transparency (or diathermancy) of rock-salt to the dark heat-rays, although optically both are transparent. Moreover, in their power of exciting fluorescent substances and in affecting the photographic plate the Röntgen rays may be compared to the ultra-violet or ether rays: they have also the property of discharging electrified bodies, a property possessed under certain conditions by violet light. But in almost all other respects the Röntgen rays differ markedly from the rays of visible or of ether radiation. They cannot be reflected or refracted; they suffer no diffraction; they have not yet been polarised.

As to their nature, many views have been advanced. The hypothesis which appears to be most satisfactory is that enunciated by Sir George Stokes, who regards the Röntgen rays as impulses communicated to the ether in an irregular or fitful manner. He gives reasons for believing that the behaviour of ordinary rays of radiant energy, when reflected, refracted, or diffused, depends upon the fact that they are composed of trains of waves periodically associated. In this way the structure of the electric vacuum waves is suggested, which it is possible to regard as a stream of Crookes' radiant matter; but their presence is indicated by the phosphorescence produced on the glass walls. By suitable contrivances the X-rays can be focussed on a definite part of the containing glass wall; and it is there that Röntgen rays are produced in quantity.

In 1894 Philipp von Lenard (an Austrian pupil of Hertz, and from 1896 professor at Heidelberg), following out a suggestion by Hertz, observed what seemed to be a passage of the cathode rays through a thin piece of aluminium which formed part of the containing wall of the vacuum tube. These 'Lenard rays,' as their phosphorescent effects and in their sensitiveness to an approaching magnet, have an undoubted resemblance to the cathode rays. There is no evidence, however, that the cathode rays have then only presence in the cathode tube: in a similar way that their bombardment of the disc on the one side may produce electrical changes capable of starting similar rays on the other. This is the explanation given by Professor J. J. Thomson, whose measurement of the speed of the cathode rays quite disproves the contention (based largely on Le不变's observation) that the cathode rays are ether vibrations. This speed was found to be about one or two hundred miles per second—that is, about 1000 times the speed of light. It was when studying the properties of the cathode and Lenard rays, which seem to differ only in their mode of production, that Röntgen discovered what he himself called the X-rays. A large and increasing literature is now devoted to the discussion of their properties and applications.

Rood (a form of the word rod) is used of the Cross of Christ, the Holy Rood, and of crosses and crucifixes generally, but especially the great crucifix which in mediaeval churches stood on the rood-screen (see SCREEN). As a measure of surface, a rood is the fourth part of an acre, and contains 40 square poles or perches, or 1210 square yards. The square rod or rood used in estimating mason-work is equal to 44 square feet.
In milder and rainier climates, roofs sloping from a central ridge are the ordinary form. Great Greek buildings were covered with marble slabs, carefully grooved together; in common Greek and Italian buildings roofing tiles are used. In the rainy climate north of the Alps steeper roofs are needed to throw off rain and snow.

Fig. 1.

Roofs well constructed serve to bind the walls together and strengthen the building; if too heavy they crush the walls. The actual covering of the roof and its supports are therefore made as light as possible, and the strength concentrated in 'principals' or 'trusses.' Fig. 1 represents a king-post roof (A being the king-post), and fig. 2 a queen-post roof (B, B being the queen-posts). The latter is used for wider spans, and leaves the centre clear for attic. Early Christian basilicas (and probably the Roman basilicas) had such roofs. In the early Gothic style the king-post was curved and the tie-beam moulded. The Decorated style introduced an arch or a series of cants (fig. 3). As the style progressed curved braces were placed under the tie-beam, to support it; these were carved, and rested on elegant corbels, the spandrels between them being filled with tracery. In the Perpendicular style the central part of the tie-beam is cut away, and the beautiful hammer-beam roofs of the period became usual (see fig. 4). The roof of Westminster Hall is one of the finest examples of this kind of roof. These open timber-roofs are much used in England both in churches and halls, but abroad chiefly in the latter, as the church roofs were more frequently vaulted. In modern times, when great spans have to be roofed over, combinations similar to those used in latticework bridges (see BRIDGE, Vol. II. p. 411) are required. Iron has been introduced, and by means of it, spaces of almost any width can be roofed over. See also CEILING, MANSARD ROOF, FAN-TRACERY, &c.

Rook (Corvus frugilegus), a species of Crow, common in Britain and in many parts of Europe and Asia, especially in northern and central regions. In late autumn there is a migration from the Continent to the eastern shores of Britain, and a return in early spring. Some of the characters of the rook have been contrasted with those of other species of Corvus in the article Crow. The plumage is bluish black; the forehead, cheeks, and throat are bare; the bill, legs, and feet are black. White and piebald spots sometimes occur. The rook does not breed till it is about two years old. The nest, built of twigs with a lining of grass and roots, is almost always on a lofty tree. The noisy cawing of the builders in March is one of the familiar signs of departing winter. The eggs (three to five) are bluish green with olive-brown markings. As to food, the rook is almost omnivorous, but it depends in great part on insects and grubs. Unlike the crow, the rook is characteristically a social bird, feeding in great flocks, nesting in rookeries, and sometimes combining to beat off a common foe. Confident perhaps in their numerical strength, and reliant on their habit of posting sentinels, rooks are by no means shy, for they sometimes nest in the trees of a town garden, and, though much afraid of a gun, soon grow accustomed to scarrecrows and noise. They are very wide-spread birds, exhibiting no small degree of that acuteness which is often displayed by gregarious birds and beasts. They show sagacity in choosing fit trees on which to nest, in posting sentinels who warn the others when danger threatens, and in distinguishing real from fictitious sources of alarm. Though quarrelling and mutual robbery are common during the nest-building, there is no doubt that rooks have a sort of social feeling, which manifests itself sometimes in the punishment which they inflict on an offending member. The same rooks seem to take possession of their old nests year after year, repairing the damage done by the winter storms. The male rook feeds the
female assiduously during incubation, and sometimes takes her place on the nest. Both parents bring food to their young ones, and the nestlings are provided with little stones essential to the grinding of the food in the gizzard. The rook can be tamed, and may exhibit something of the inclination to peck possessed by several related birds. While rooks are useful in so far as they destroy many injurious insects and grubs, they sometimes damage trees by breaking off the twigs, they root up grass and young corn, and do other damage to the crops. In moderate numbers they are useful, but in multitudes they are compelled to leave their natural food and become injurious.

Rooke, Sir GEORGE, British admiral, was born in 1690, near Canterbury, at the country-seat of his father, Sir William Rooke. Entering the navy, he found himself at thirty a post-captain, and in 1699 was promoted to the rank of rear-admiral of the red. He took part in the action off Beachy Head between the Earl of Torrington and a French fleet under Toulouville; and in 1692 he distinguished himself greatly in the memorable battle off Cape La Hogue, fought between the French fleet and the combined English and Dutch force under Admiral Russell. For this he received the rank of vice-admiral of the red, knighthood, and a pension of 4100 a year. In 1702 he commanded the expedition against Cadiz, and destroyed the Plate-fleet in the port of Vigo. In conjunction with Sir Clodgesley Shovel he accomplished the capture of Gibraltar, 21st July 1704. On the 9th August of the same year he engaged off Malaga a much heavier French fleet under the Comte de Touloune, and fought one of the bloodiest of naval battles, the honours of which fairly remained with the English, though the escape of the enemy's fleet through the hazy weather rendered it a somewhat barren triumph. The struggle lasted through nearly a whole day; the French loss was upwards of 3000, the English upwards of 2000 men. Sir George was received with marked distinction by Queen Anne, but, finding the government hostile to him on political grounds, retired, and led the life of a Kentish gentleman till his death, 24th January 1760. See his Journal, edited by Oscar Browning for the Navy Records Society (1897).

Roon, Albrecht THEODOR EMIL, COUNT VON, Prussian soldier, was born at Plessnagen near Kolberg in Pomerania on 30th April 1803, entered the army in 1821, was appointed in 1827 to teach in the cadet school of Berlin, and joined the general staff in 1833. He held amongst other positions that of topographer in the general staff surveys (1833-35), teacher in the military academy (1835), military tutor to Prince Frederic-Charles (1843), and member of the commission for reorganising the Prussian army (1859). He carried the bill for army reform through the House of Representatives; his labours in reorganisation produced brilliant results in the great wars of 1866 and 1870-71. He was made war minister in 1859, and marine minister in 1861, was created count in 1871, and received the rank of field-marshal in 1875. For a few months he was president of the Prussian cabinet, retiring in November 1873. He died in Berlin 23d February 1879. A pupil of Karl Ritter (q.v.), Von Roon used his teacher's methods in an elementary general geography (12th ed. 1868) and a more advanced work dealing with the general geography, ethnology, and politics (3d ed. 1847-53). He was the author of Life of Von Gossler (1879), an anonymous Life (Götterschloss, 1888), and Deutsche Revue (1890-91).

Roosevelt, Theodore, American statesman and author, was born in New York City, October 27, 1858. Graduated from Harvard College in 1880, he soon took active part in the politics of his city and state. He was appointed assistant-secretary of the navy in 1897, but in 1889 became lieutenant-colonel of a cavalry regiment (the 'Rough Riders') recruited largely from among the cattlemen of the western plains, and noted for its part in the fighting before Santiago de Cuba; he was soon made full colonel. In November 1898 he was elected governor of New York, and in 1900, vice-president of the United States; he succeeded Mr McKinley as president in 1901. He is the author of a large number of books. His published works include volumes of hunting and ranching experiences, history, and biographies.

Root, in its physiological rather than its strictly morphological sense, is that part of the plant which (1) absorbs nourishment from the soil or water and not from the air; (2) fixes the plant to the earth, and grows downwards into the earth, and away from the light, not upwards, and towards the light, as 'shoots' do; this will include the complex roots of the seed plants, the rhizoids of cryptogams, and the mycelia of fungi, in contradistinction to all those parts of plants which grow upwards towards the light and produce reproductive organs, which may conveniently be called shoots. But organs morphologically of the same kind may have different forms and different functions; thus shoots may function as roots, and roots may grow up into the air as new reproductive organs. Further information as to the physiology of roots will be found in the article upon VEGETABLE PHYSIOLOGY; in this article it is chiefly the morphology of roots that will be dealt with.

As the leaf surface of a seed plant is developed the root system grows; in a large sunflower it occupies about one cubic yard, in a large tree hundreds of cubic yards. This system, resulting from the branching of the primary, secondary, and other roots, the ultimate divisions consisting of root-hairs, is so complete that scarcely the space of a quarter cubic inch is unoccupied. Abundance of water, to balance the transpiration, and of salts, for other purposes of plant-life, is thus secured. The root system of aquatic plants is small, water being easily obtained and transpiration slight.

All roots at first are thin hair-like organs; the greater thickness that those of the dicotyledons attain is due to a secondary growth. The thickened roots serve only as organs of attachment, and of course as conductors of water and salts. Their chief functions as organs of absorption. Those absorbing parts, root-hairs, are protuberances of the outer layer of cells of the roots. They arise shortly behind the growing tip, and they die off in a few days, so that only an inch or two of root bears root-hairs. In this way the root-hairs come into contact with portions of untouched soil.

A longitudinal section near the apex of a root of a seed plant shows the following arrangement of
parts. Near the apex is the growing-point, a mass of actively dividing cells, called the primary meristem; by division these give rise to, below, several layers of simple cells (the root-cap), above, the main meristem; above the latter, in turn, is the epidermis. Above the primary meristem, consists merely of simple meristem cells. A little higher up the meristem differentiates into three layers—the dermatojen, the periblen, and the plicrome. These undergo further differentiation, so that a mature root consists of the following parts: (1) an outer layer, the epidermis, developed from the dermatojen; (2) several layers of simple cells, the cortex, developed from the periblen; (3) the fibro-vascular cylinder, an innermost mass of simple cells, and the pith, both developed from the plicrome. The root-cap serves as a protection to the delicate growing-point of the root as it forces its way through the soil. It is continuously worn away by the particles of the soil, and as continuously reformed by the primary meristem cells. The epidermis binds the whole together, and many of its cells develop into long hairs, the absorbing root-hairs already mentioned. The cortex has no special function. The bundle sheath, when it occurs, separates the cortex sharply from the rest of the root. The fibro-vascular cylinder is the part of the root that acts as the channel for the ascending water and salts (excretions) and, in some cases, of the tubes of attachment. The cylinder consists of smaller bundles of wood vessels and of bast fibres arranged alternately. The centre of a young root is occupied by pith.

Secondary thickening may occur in roots as in stems of the is due to the formation of a layer of actively dividing cells, the cambium. The bundles of wood and bast are placed alternately in a cylinder, and the cambium ring seen in transverse section waves in and out so that it passes inside the base or outside the apex. This result of this is that the secondary thickening of roots results in a mass of tissue similar to that formed by secondary thickening of stems (see stem). Thickened roots usually lose their original cortex and epidermis and gain a fresh covering in many cases it is a woody one. Root sheath or endodermis, is differentiated which envelops the fibro-vascular cylinder; within this lies a layer of parenchyma, simple tissue; it is called the pericambium or phellogen. This layer gives rise to the new covering, which consists of two parts, phelloderm and periderm (which is of cork), corresponding to the original cortex and epidermis.

Forms of Roots of Seed Plants.—The primary root is merely the enlarged radicle of the seedling; it is the direct prolongation of the stem. All secondary roots arise from this first root; the secondary roots may give rise to others and so on until the common much-branched root is formed. If the primary root is very thin the whole system is called a fasciculated root; if the secondary fibres are also very fine it is called a fibrous root (e.g. the lilies). If the fibres are very much thickened it is said to be a tuberous root (e.g. the dahlias). When the primary root is much thicker than the secondary roots it is called a tap-root, and may be further classified according to its shape, as spindle-shaped (e.g. the carrot) or turbin-shaped. Much thicker, however, are the roots of woody plants, e.g. the fasciculated root of the Turk's cap, lily, or the tap-root of the turnip. Roots are also described as fleshy (e.g. the beet-root), or as woody (e.g. the roots of trees). Fleshy roots usually die in the autumn; woody roots may live for many years, even when the shoots die down every autumn. Roots are usually buried in the soil, but they may be aerial, as for instance the roots of climbing plants such as ivy; these arise from the stem and fix the plants to their supports. In the tropics many plants have aerial roots; thus the mangrove forms forests in the swamps. The Indian fig has many aerial roots which become fixed in the ground, new plants may spring. Orchids are examples of the Epiphytes, which have aerial roots which merely fix the plants to trees but do not derive any nourishment from them. Aquatic plants often have roots which do not penetrate into the mud but grow outwards and become fixed in the ground. Many plants will form new roots after all the old ones have been cut off if they are placed in water or in a damp soil. This is taken advantage of by gardeners in their method of propagating such plants as fuchsias, oleanders, &c. from cuttings.

Essential roots are numerous, and many roots also contain secretions either peculiar to themselves, or more abundant than in the other parts of the plant, and become therefore useful in medicine or in the arts, while some are very poisonous. The roots used for food, besides the Tuber (q.v., Bulb (q.v.), and Corn (q.v.), are generally those which are thick and fleshy. The plants to which they belong are of very different genera and orders—some of the natural order Cruciferae, as the turnip and others of the genus Brassica—some of the order Coniferae, as beech and mango, worman; some of the group Urticifera (e.g. dandelion, parsnip, &c.) and some of the order Liliaceae.

Comparative.—Most of the Thallophytes (Alge, Fungi, and Lichens) have only a rudimentary differentiation into stem, leaf, and root, or none at all; but the most highly developed members of those groups which have a well-developed stem, have a simple system of division of parts to which such terms may be given; still the roots even of these are distinguishable from the roots of vascular plants by the absence of a root-cap, and by their branching, which is never endogamous.

The Vascular plants are divided into two classes, the Lycopsida, &c. are highly differentiated in form and in their tissues. The roots arise in acropetal succession on the stem, or in many ferns on the petioles; their branching is monopodial or dichotomous; they are all alike—the first root never becomes like a tap-root. The lateral roots are of two kinds: the primary root, which gives rise by successive divisions of an apical cell. The Selaginella, a group of the Lycopodinae, are remarkable for having true roots, but a few have no root-caps on them. The growing-point too is formed by a primary meristem and not by a real cell.

The roots of the Seed Plants, consisting of Gymnosperms—i.e. Cycadee, Conifer, Taxacee, and Gnetacee, and of Angiosperms—i.e. Monocotyledons and Dicotyledons, have already received a general description; a few points of comparison may here be repeated. The primary root is a continuation of the primary stem; it is directed towards the micropyle of the embryo-sac (see ovule), and even it is of endogenous origin, its first rudiment being covered by the nearest cell of the suspensor. All the parts of the seed plants, shoots, stems, and roots as well as roots, are distinguished from the parts of all other plants, except the Lycopodinae, and for a short time the embryos of some Coniferae, by having a small-celled primary meristem at the growing apices instead of the typical apical cell of many Algae, and of the Muscéaceae, Lycopodinae, ferns, and Tmesipteris. The apical cells in the cryptogams, not as in the cryptogams, by transverse divisions of an apical cell, but by rapid division in the direction of the apex, and in gymnosperms from the periblem, in angiosperms from the dermatojen. Also the first rudiments of lateral roots, shoots, and leaves do not arise from single cells, as in the cryptogams, but from protuberances of a few small cells. The formation of a close cambium ring in
the primary and stronger lateral roots, and the subsequent secondary increase in thickness, is a characteristic of gymnosperms and dicotyledons, and does not occur in the cryptogams. This habit often results in the formation of persistent root systems, which in the monocotyledons are often replaced functionally by rhizomes, tubers, and bulbs.

The stems of the Cycadeae are not unlike those of the Tree-ferns, but unlike them they have tap-roots. The roots of the C. encephalartos appear above ground. In the Coniferae, the endosperm bursts the seed-coat at the root end, and the root, which develops a strong tap-root with lateral members, is thrust out.

The primary root of monocotyledons soon ceases to grow, lateral roots spring from the axis, each new root spring from a point higher up the stem, and being stronger than the older ones, there is no secondary thickening and no persistent root system. Some saprophytic monocotyledons form no roots at all. In dicotyledons an axis below the cotyledon is called the radicle, but the upper and often the larger portion consists of a part of the stem called the hypocotyl; the lower part is the true embryo root. The root is the first part to issue from the burst seed-coat; it grows and gives rise to lateral roots. If the primary stem grows vigorously, the roots also grow relatively and form a tap-root. If the growth ceases adventitious roots are often formed between the former lateral ones, which may themselves give rise to lateral roots. For further information, see Sachs's Physiologia Plantarum (1887) and Goodell's Classification and Morphology of Plants (1887).

Root-stock or Rhizome is the name given to an underground stem when its shape is cylindrical; to a creeping stem, in short. It is easily distinguished from a root by the fact that it ends in a bud, and bears leaves from which it grows, whereas a root has no bud there and there. In the autumn the aerial leaves die down, but the rhizome lives through the winter, and in the spring its terminal bud goes on growing. Rhizomes are usually by the autumn well stored with reserve food-matter for the use of the bud in the following spring. Examples: the amanama, the lily of the valley, the yellow iris, many ferns.

Root, in Algebra, denotes any value of the unknown quantity in an equation which will render both sides of it identical (see EQUATIONS, INVOLUTION). The square root is that number which, multiplied by itself, gives the given number; the cube root, the number whose cube, multiplied into itself and then into the product, produces the given cube; so with fourth root, fifth root, &c. The determination of the roots of equations, either formally or actually, constitutes the greater portion of the science of Algebra.

Root-parasites, plants which grow upon, and derive their nourishment from, the roots of other plants. Such are the Broom-ropes (Orobanchaceae, q.v.), species of Thesium, &c., and the Rafflesia (q.v.); with other Rhizanthaceae (q.v.).

Ropes. The staple fibre for ropes has long been Hemp (q.v.), but since the middle of the 19th century many other fibres have come largely into use. Hemp is better suited for cordage (the general term for ropes, cords, and twine of all kinds) than for weaving purposes, because it gives way when much folded into sharp folds more readily than other important textile fibres. Jute, for instance, (Manihot esculenta or Manihot tex-tilis; see ABACA), belonging to a quite different order of plants from the common hemp, makes the strongest ropes now manufactured, and is largely employed. Coir fibre, from the husk of the cocomut, is also an important rope-making material which, though long used in India, has in Europe only taken its place as a valuable cordage fibre in comparatively recent years. It is fairly strong, and, size for size, it has the advantage of being considerably lighter than either hemp or manila. Unlike these fibres, hemp is never employed as a rope. Sisal hemp, from the Agave sisalana of South America, though not nearly so strong as common hemp, is also much used, especially for ropes of small size. For certain purposes, such as driving parts of textile machinery, cotton ropes are largely employed. There are only two other rope fibres which as yet can be said to be of any importance in Britain—viz., the Sunn hemp (Crotalaria juncea) of India and the Phorviun tenax of New Zealand. A large number of plants valuable for cordage grow in India, for a list of which, as well as for an account of the native process of rope-spinning, see Balfour's Cyclopedia of India.

As regards the strength of ropes, it will be readily understood that in this respect specimens of the same kind of vegetable fibre will vary considerably. Healthy plants will yield a better fibre than those of more feeble growth, and some supplies of the same kind of material will have been more carefully prepared for spinning than others. The amount of care and skill bestowed upon the spinning process itself will also vary with the skill of different manufacturers. Tarred ropes, again, though more durable, are not so strong as when left untarred; and as tar is liable to be impure it will happen that it weakens or injures the fibre more at one time than at another. These matters will partially cancel each other out in an unimportant way and frequently occurs in the strength of two similar ropes which might be supposed to be equally strong. In the valuable work by W. G. Kirkaldy on his father's System of Mechanical Testing (1891) he gives the breaking stress of a large number of tested ropes, and in his remarks on this section of his experiments points out that the strength of some of these is much lower than it ought to be. He thinks that this can only be accounted for by adulteration of the fibre. It is probable that jute is sometimes mixed with better material. In one instance he found some rubbish called 'batch' hidden inside the rope. The following examples will show approximately the comparative strength of ropes made of three different materials. They are taken from a table supplied by Mr. Kirkaldy, and show the results of the testing of seventy specimens of ropes.
is above the average. Mr Kirkaldy states that the calculated ‘stress per fathom-weight,’ by a method akin to calculating the tensile strength per square inch of metals from actual tests, gives a more useful basis to compare the value of ropes than the breaking stress does. This stress per fathom-weight in each of the above examples was: hemp, untailed, 3457 lb.; hemp, tailed, 2631 lb.; manilla, 625 lb.; cotton, 2860 lb.

Rope-making by Machinery.—By this is understood the making of ropes by machines which do their work without the necessity of having a rope-walk. The hecketing, the drawing, and the spinning frames for preparing rope yarns are the same in principle as those used for spinning linen yarn for weaving purposes. There is, however, some difference in detail, owing to the greater average weight of rope yarn, so that, for example, there are comparatively few bobbins on the spinning-frame proper. Separate machines are perhaps more generally used for making strands and for laying these into ropes than compound machines which perform both operations, especially for very thick ropes. All these are now made of different designs, and with a good deal of variety in their details. The雪山 follies, as well as the Hanoverian and the Guittinane's patent compound rope machine will give a fair idea of one of the newest forms of this kind of apparatus. It was constructed to make three-strand ropes up to 35 inches in diameter, there being in the one here figured six bobbins for each strand. It is furnished withchange wheels, to enable either hard or soft laid ropes to be made. From a fuller description in The Engineer (7th March 1890) we extract the following: ‘The yarns being wound round on the bobbins in suitable numbers, according to the size of the rope to be made, they are from each bobbin threaded through a head-runner (register-plate) of six holes, and gathered at a die at which they are closed into strands, there being a separate die for each of the three strands. The strands being formed, they are then threaded through a main head-runner of the holes, and immediately closed at the main closing die into a finished rope. The rope is drawn over the die by means of strong hauling-off drums, and ultimately wound on a storage reel.’—Wire-ropes (q.v.) and textile fiber ropes are now largely employed for driving machinery instead of belting.

Roquefort (Lat. Rocca), ST, the patron saint of those sick of the plague, and the enemy of cattle- plauge. He was born in Montpellier, about 1205, devoted himself to the care of the sick from the plague, especially in Italy, and died in 1327.

Roquefort, a village in the French department of Aveyron, situated on the western edge of the Causse plateau, 44 miles N. by W. of Béziers and 10 SW. of Millau, and celebrated since Roman times for its ewe-milk cheeses. Pop. 973.
**Rorqual** (Balaenoptera), a kind of baleen whale, to which the names of **Razer-back**, **Flower**, and **Razor-back** are also applied. The genus includes the largest and some of the commonest whales, and is represented in all seas. The head is flat and pointed, the body is slender, the skin of the throat is deeply folded in longitudinal plaits, the whale is short and coarse, and there is not much blubber. The 'blue whale' (B. stellaldis), the largest living animal, may attain a length of 80 or 85 feet. It seems to pass the winter in the open sea, and approaches the coast of Norway at the end of April or beginning of May, and is sometimes stranded on British coasts—for instance, in the Firth of Forth. The Common Rorqual (B. acutoce- lopus) attains a length of 60 to 75 feet, and it often comes ashore on British coasts. Rudolph's Whale, or Northern Rorqual (B. borealis), does not exceed 50 feet in length; and yet smaller is the Lesser Rorqual (B. rorutata), which measures about 30 feet. The former is not uncommon in the more northern seas, while the range of the latter extends from the Mediterranean to Davis Straits. The rorquals seem to feed on small crustaceans, and sometimes on small fishes. Though not nearly so valuable as species of Baleen, they are often captured by the whalers. See WHALE.

**Rosaceae**. A natural order of exogenous plants, containing many species of great usefulness, and many that are in the highest esteem for their beauty and fruit. It contains trees, shrubs, and herbaceous plants, natives chiefly of cold and temperate regions, and far more abundant in the northern than in the southern hemisphere. Within the tropics they are chiefly but not exclusively found in elevated situations. The leaves are alternate, have stipules, and are either simple or compound. The flowers are generally hermaphro- dite, but sometimes unisexual; the inflorescence various. The calyx is 4 to 5 lobed, generally 5-lobed; the petals as many as the divisions of the calyx, or occasionally wanting, perigynous. The stamens are few or many, arising from the throat of the calyx, or occasionally from the ovary in a band. The ovary is often 3-celled, with a lateral style, or a number of styles united into a many-celled pistil; the ovules generally two or more. The fruit is sometimes a drupe; sometimes a pome; sometimes follicular; sometimes a nut; sometimes a collection of nuts enclosed in the fleshy tube of the calyx; sometimes a collection of small drupes forming a head, as in the raspberry; and sometimes, as in the straw

**Rosa**, CARL, whose real surname was **Rosse**, was born at Hamburg on 22d March 1843, and studied music at Leipzig and Paris. After conducting a concert and operatic tour in the United States in 1871-72, he came to England, his intention being to produce standard operas with an English text. But it was 1875 before he was able to carry out his intention. London gave him little encouragement; the prejudice against English opera was too strong. The provinces, however, welcomed the new undertaking and made it successful. Carl Rosa may be called the father of English opera in two senses: he not only produced the great operas of German, French, and Italian composers with English texts, but he encouraged native composers to write operas, by giving them commissions for works. It was in this way that such operas as Goring 'Thames' (1881), 'Rome and Jerusalem' (1895), and Mackenzie's 'Columbia and Troubadour, Dr V. Sanford's 'Canterbury Pilgrims,' &c, came to be written. He died 30th April 1889. Madame Paragua-Rosa (1839-74), a distinguished vocalist, was his wife.

**Rosacea**. See AUCK.

**Rosacea**, a natural order of exogenous plants, containing many species of great usefulness, and many that are in the highest esteem for their beauty and fruit. It contains trees, shrubs, and herbaceous plants, natives chiefly of cold and temperate regions, and far more abundant in the northern than in the southern hemisphere. Within the tropics they are chiefly but not exclusively found in elevated situations. The leaves are alternate, have stipules, and are either simple or compound. The flowers are generally hermaphro- dite, but sometimes unisexual; the inflorescence various. The calyx is 4 to 5 lobed, generally 5-lobed; the petals as many as the divisions of the calyx, or occasionally wanting, perigynous. The stamens are few or many, arising from the throat of the calyx, or occasionally from the ovary in a band. The ovary is often 3-celled, with a lateral style, or a number of styles united into a many-celled pistil; the ovules generally two or more. The fruit is sometimes a drupe; sometimes a pome; sometimes follicular; sometimes a nut; sometimes a collection of nuts enclosed in the fleshy tube of the calyx; sometimes a collection of small drupes forming a head, as in the raspberry; and sometimes, as in the straw
berry, it is an enlarged fleshy receptacle with the seeds imbedded on its surface. This natural order contains at least 1000 known species; but in some of the genera, as Rosa and Rubus, the determination of the specific limits is difficult, and some—sometimes reckoned species—are numerous. The order, as generally received, is divided into a number of sub-orders, several of which have by some botanists been elevated to the rank of distinct orders, as many of the Pomoceae, Sanguiisorus, B. Rubus, Strawberries, Rubus, Rubus, Tormentilla, Toxaitis, Agrimony, Geum, Spirea, Cusso, &c.

Rosamond. See Clifford.

Rosamulline. See Dyeing.

Rosario, the third city of the Argentine Republic, and the largest in Santa Fé, is on the west bank of the Paraná, 190 miles by rail N.W. of Buenos Ayres, 210 miles by river. It has an excellent harbour, and carries on a large commerce direct with Europe; the exports exceed $3 and the imports 5 sterling. The houses for the most part are of single story; for the rest, the city is laid out on, a smaller scale, on the lines of Buenos Ayres, with narrow streets, ill paved, few and paltry plazas, and only one monument of note, a lofty marble shaft (1853) to that figure of Voltaire surrounded by four statues. Tramways (with 6 miles of rails) run in every direction, and there is a telephone to Buenos Ayres. The city possesses an exchange, a theatre, a great bullring, two markets, hospitals, steam-elevators, sugar-factory, &c. Rosario was founded in 1725. Pop. 1857, 135,000.

Rosary, a string of larger and smaller beads used by Catholics as an aid to memory in keeping account of the number of Paternosters and Ave Marias recited. There are various patterns in use; a very ordinary one is a rosary of fifty-five beads, fifty small ones for the Ave Marias, separated into groups of ten by five large ones to mark Paternosters. The custom of reciting the Lord's Prayer many times in succession dates from a very early period of the Christian church; the custom of keeping a note of the prayers recited by means of strings of beads was.first adopted in the East among Hindus and Mohammedans that the use of the rosary for this purpose has been said to have been introduced into Christian Europe by the Crusaders. The name (Lat. rosarium, 'a garden of roses' or 'chapellet of roses') first occurs in the 13th century, and seems to have been derived from Rosarium mysticum in a form given to the Virgin herself, or from a set of prayers being thought of as the Virgin's rose-garden; less probable is the suggestion that the name comes from the beads being originally made of rosewood. The beads are now of various materials—berries, wood, stone, ivory, metal, &c., and are often of costly workmanship, and of considerable intrinsic value. They are blessed for the use of the people by the pope, by bishops and superiors of religious orders, and by others having special power for the purpose. The rosary is also given to the Rosary of the Blessed Virgin consisting of fifteen decades, comprising fifteen Paternosters and Doxologies, and 150 Ave Marias, divided into three parts. The Lesser Rosary consists of one of the three parts, comprising five decades or mysteries.

Rosas, Juan Manuel, Argentine dictator, was born in Buenos Ayres, 30th March 1793, entered the army of Buenos Ayres in 1810, was appointed to the Order-in-chief in 1826, and was governor of the province from 1829 to 1832. Then, being disappointed of re-election, he headed a revolt, and in three years succeeded in obtaining office again, with extraordinary powers. From 1835 to 1852 he governed as dictator, not of Buenos Ayres alone, but practically of the interior also. His rule was a rule of terror and nearly constant bloodshed; one of his chief opponents published, so early as 1843, a detailed list of 22,405 victims of the relentless savagery with which he pursued his policy of extermination against his opponents, among the advocates of centralisation, that is to say, as opposed to the Federalists, for whose principles Rosas professed to contend. Many refugees found an asylum in Uruguay, and therefore Rosas willingly supported the attempts of his partisan, General Orle, to make himself master of his republic, and, after the fall of Orle's government, Rosas in 1839 invaded Uruguay with 7000 men, was defeated, and in 1843 sent Orle back with an army of 14,000 men to attack Montevideo. The long siege which followed led to the joint intervention, in 1845, of England and the United States of Buenos Ayres (1845-47), and the temporary opening of the Paraná to free navigation. But the river provinces could not be induced to rise against Rosas, until in 1849 a treaty was signed by which he secured for Buenos Ayres the entire navigation of the Plate, the Uruguay, and the Paraná. This aroused the other Latin provinces, and in 1853 Urquiza, the governor of Entre Rios, supported by Brazil with both money and men, defeated Orle in Uruguay, and won over his troops; then, with a force of 30,000, he marched against Rosas, and on 3d February 1852 routed him at Monte Casto, near Buenos Ayres. Rosas escaped to England; and, although the Argentine congress in 1861 condemned him to death as a 'professional murderer and robber,' specifying 2004 assassinations carried out by his orders, he lived comfortably near Southampton until his death 14th March 1877.

Roscellins, See Scholasticism.

Roscher, Wilhelm, the most eminent exponent of the historical school of Political Economy (q.v.) in Germany, was born at Hanover on 21st October 1817. He studied at Göttingen and Berlin, and in 1843 was appointed professor of Political Economy at Göttingen, but in 1848 was called to fill the corresponding chair at Leipzig. His principal works are System der Volkswirtschaft (4 vols. 1834-36 ; 15th ed. 1887; 21st ed. 1894; Eng. trans. 2 vols. Chicago, 1879), Die Nationalökonomie des Ackerbaus (10th ed. 1894), Grundlagen der Nationalökonomie (17th ed. 1884), Geschichte der Nationalökonomik in Deutschland (1874), Zur Geschichte der englischen Volkswirtschaftslehre (1851-52), Kolonien, Kolonialpolitik und Auswanderung (3d ed. 1883). He died 3d June 1894.

Roscius, Quintus, was born at Solonium, a village near Lahoscium, and rose to be the greatest comic actor in Rome. So great was his success that many of the Roman aristocracy befriended him, and the dictator Sulla, as a token of favour, presented him with a gold ring, the symbol of the equestrian order. Among his most admired and affectionate patrons Roscius also numbered Cicero, who, at the commencement of his career, received lessons of elocution from the great comedian, and even in later life used to make trials of skill with his instructor as to which of them rendered a thought most clearly and effec-
tively—the orator by his diction, or the comedian by his gesticulation. So sensible was Roscoe of the distinction he enjoyed in sharing the intimacy, and even the friendly emulation of the great orator, that he came to look upon his art as one of no small importance and dignity, and wrote a treatise on the art, and compiled methods and rules for improving himself in writing and acting. Cicero's friendship was of use to him in another way, for on his being sued at law by C. Fannius Chereca for the sum of 50,000 sesterces, Cicero defended him before the judex Piso (probably 68 B.C.) in his extant oration, Pro Q. Roscio Condito. He is said to have spent 10 years of his life in practising this art; and his accomplishments and perfection in his peculiar art that to be a 'Roscius' became synonymous with pre-eminence in every profession, and leaving, like his famous contemporary, Apollus the tragedian, an immense fortune, realised the stage. See Ribbeck, Die Botenische Tragodie (Leip. 1783).—For the 'Young Roscius,' see BETTY.

ROSCOE, William, historian, was born at Liverpool on 8th March 1733, his father being a market-gardener. In 1769 he was articled to an attorney at Liverpool, and began to practise there on his own account in 1774. About this time he assiduously cultivated his mental powers, turning his attention especially to the Italian language and literature. In 1773 he first appeared in print as the author of a poem, Mount Pleasant, now forgotten; and in 1787 and 1788 published Wrongs of Africa, an extraordinary protest against the slave-trade. But it was his Life of Lorenzo de Medicis, called the Magnificent (1796), which established his literary reputation; it went through several editions, and was translated into German, French, and Italian. In 1835 appeared his second important book, Life and Pontificate of Leo X. This, like the former, appeared in German, French, and Italian, and was received with much commendation, though its tone and spirit, especially with reference to the Reformation, were severely criticised. About the year 1800 he became partner in a Liverpool bank, a step which involved him eventually in great pecuniary embarrassment. From his pen came, beside the above-mentioned books, a collection of Poems (1857), of which by far the best is 'Kittfoot's Butterfly's Ballads,' and a Monograph of B. R. Jones (1822). He issued an edition of Pope in 1825. Roscoe died at Liverpool, June 30, 1851. During the later years of his life he gave much attention to the study of botany, and wrote a monograph on Monasplian plants. See Life by his son Henry (1835), and Aspinasse's Lancashire Worthies (24 series, 1877).

SIR HENRY ENFIELD ROSCOE, chemist, born in London 7th January 1833, was a grandson of the above, and the son of Henry Roscoe, barrister. He was educated at the Liverpool High School, and later at University College, London, and at the university of Heidelberg. He was appointed professor of Chemistry in Oxens College, Manchester, in 1838, and rendered valuable services towards the organisation of this institution. He was returned un-opposed for the borough of Manchester in 1883, was re-elected in 1886, and in the latter year he resigned his professorship. He has served on the Royal Commissions on Noxions Vapours and on Technical Education, and is a member of the British Association. Honours and distinctions of Chemical science the most important are researches on the measurement of the chemical activity of light, and on vanadium and its compounds. His published works include Spectrum Analysis, a course of lectures (1868) on the subject; his well-known Lessons in Elementary Chemistry (1870); and his Treatise on Chemistry (written in conjunction with Schorlemmer), in 3 vols. (1878-89; new ed. 1894 et seq.). He lost his seat in parliament in 1895.

Roscoff, a seaport on the north coast of the French department of Finistere (long the headquarters of smugglers into England), 33 miles N.E. of Brest. The trade are all sail, as all livestock and vegetables. The place is resorted to for sea-bathing, and here is a marine zoological station. The garden of the Capuchin monastery contains a fig-tree whose branches, trained over scaffolding, would give shelter to 200 people. Pop. 1731. Here Mary Queen of Scots landed in 1548, and the Young Pretender after his escape from Scotland.

Roscommon, an inland county of Connaught, Ireland, is bounded on the E. by the Shannon, and on the W., in part, by the Suck; it is 62 miles long from north to south, by 26 miles from east to west. Area, 607,691 acres, of which barely one-fifth is under crops (hay, potatoes, oats); more than one-half is permanent grass; one-sixth is waste. It belongs to the central plain of Ireland, but rises in the north into the Curlew (800 feet) and Brandon (1,527 feet) mountains. Several lakes occur, as Allen, Bodeg, and Ree, expansions of the Shannon, and Key, Gara, and Glena in the north-west. The soil in the central districts is in general light, but fertile, and affords some of the finest sheep-pasture in Ireland in the 'Plain of Boyle.' The chief industry is the rearing of sheep and cattle, especially the former. Coal and iron exist, but are not worked; there are no manufactures. The chief towns are Roscommon, Boyle, Castlerea, Elphin, and Strokestown. Pop. (1841) 25,411; (1851) 13,149; (1881) 14,831; of whom 110,147 were Roman Catholics. Roscomon sends two members to parliament, one for each of the divisions. It possesses a number of Celtic antiquities, raths, &c., several remains of strong castles, and some fine ecclesiastical ruins.

Roscommon, the county town, 96 miles W. by N. of Dublin, dates from the 13th century, when it arose around a Dominican abbey, founded by the O'Conor in 1257, and a castle built ten years later by Sir Robert de Ufford; the remains of both still exist. Roscommon, pop. 2,117, has an important cattle-market.

Roscrea, a market-town of Tipperary, Ireland, 77 miles S.W. of Dublin, is a very ancient town; here St. Croman built a church, and had a celebrated school in the 7th century. Considerable remains of a castle, a lofty round tower 80 feet high, and ruins of two abbeys exist. Pop. 2,901.

Rose. The rose, the most lovely and fragrant of flowers, the favourite of poets and the national emblem of England, is a shrub or sometimes a tree, very widely distributed, and giving name to the large and comprehensive order Rosaceae, to which some of our choicest fruits belong. Restricting ourselves to the genus Rosa, which alone we acknowledge as the rose, we find the characteristics thus: shrubly growth, stems generally prickly, leaves alternate, stipulate, flowers terminal, often corymbose, spreading with petals, in colour white, yellow, crimson, red, staminating; petals numerous, styles exerted, seeds (achenes) numerops, enclosed in a fleshy berry, globular or oval, which is known as the hip or hop, and is in some sort edible. The calyx is generally five-lobed, and the petals are usually 5, or 10, or 20, or 25, or 40, (as in the rose moss) furnished with a beautiful process of filament.

(1) The wild rose is a native of the northern
hemisphere, found in all temperate climes, and even as far south as Abyssinia, the Indian Peninsula, and Mexico, extending also to the Arctic zone, and of such diversity that more than 200 species were admitted by former botanists, which have now been reduced, however, to less than a fifth of that number. In Britain we find it indigenous as *Rosa spinosissima* (the Burnet-rose, from which descend the many varieties of Scotch rose); *Rosa canina* (the Dog-rose of our hedges, with several sub-varieties); *rubiginosa* and *micrantha*, well known as the Sweet Briars; *arvensis*, a prostrate and unfragrant kind; *tosentosa* and *villosa*, having downy foliage and deep red blossoms. The recent tendency of botanists, gladly accepted by the gardener, has been to restrict the number of species and allow more scope to variety, so that the above list may soon be compressed.

(2) The cultivated rose is a fuller and generally larger form, obtained by the nurture and skill of the gardener, and still receiving improvement by skillful crossing and loving observance. In the *Gardener's Chronicle* of 1885 may be found Mr. Baker's scientific classification of garden roses, which are marshalled into ten companies or groups, chiefly according to leaf and prickle. Mr. William Paul, however, in the last edition of his great work, permits us to reduce these ten groups to six, which will be as follows: Simplefolia, Scented, Banksiana, Decaisne, Centifolia, and Caninae. But the general grower may well content himself with the arrangement in the catalogues of our leading nurseriesmen, as recognised by the National Rose Society, and observed in our chief exhibitions; though the principles of division of the botanical, neither is the broad line drawn betweensummer and 'perpetual' roses always justified by fact; so that many good rosarians now protest against the too popular neglect of a fragrant, lovely, and free flowering class.

(a) Summer roses, thus estranged by a hasty vote, are of many families, and bloom for the most part in June and July—the Bouralt, the Scotch Rose, the Damask, the Providence, the Moss, the French and Hybrid French, the Bourbon and Chinese Hybrids, the Austrian and Sweet Briar, the Ayrshire, Evergreen, and Multiflora, the Polyantha, Prairie, and Banksian roses, as well as some few others. Many of these are of the greatest beauty—for instance, the Moss rose, perhaps the loveliest of all flowers; and some are the best of all for trellis or for pillar, and the hardest in bad weather.

(b) The Perpetual, or *Remontant* rose, as the French more correctly term it, instead of making growth alone after the gorgeous summer show, affords a succession, more or less continuous according to variety and weather, of bud and bloom until the fruits forbid. Yet even with these it is rare to find the aftermath of beauty as free or as fine as the summer crop had been; and many of the so-called perpetuals retire as weekly as the summer rose, especially in dull seasons. Perpetual roses are chiefly as follows: the Chinese or Monthly, the Hybrid Perpetual, the Tea-scented, Bourbon, Noisette, Macartney, Rugosa, Microphylla, Lawrenceana, and Perpetual Scotch. The old Chinese, *Rosa Indica*, commonly called the Monthly Rose, is still popular as an early and abundant bloomer; so are the Bourbons and Noisettes. But the Hybrid Perpetual and Teascented are now the chief favourites of the rose-grower, and have almost engrossed his attention. Of these two classes the former has for many years been undoubtedly the leading rose, but the Tea begins more and more to vie with it in favour, and many rosarians now place it first, for its exquisite refinement, grace, and delicacy, bewitching modesty, and pensive charm. But the hybrid perpetual claims bolder brilliance, more velvety damask, and profundity of glow. And indeed it seems difficult to achieve or conceive more perfect beauty than has already been attained by loving ingenuity and persevering skill in many of the roses we now possess; though manifold gardeners are hankering still for a blue rose, which would not accord with the form and tint of the foliage if they got it.

Roses are also divided, according to the form of flower, into globular, cupped, compact, and expanded, the last named often becoming reflexed in the later stage of bloom; and again, according to modes of culture, into standards, half-standards, and pyramids, bushes, pendulous, pillar, and trellis form. The standards and half-standards, once so popular, are now in less demand, though still approved by those who plant for exhibition, or special effect at a distance; and the bush (the more natural and easy growth) becomes every year more general. For pillar and trellis work there are but few of the hybrid perpetuals and tea-scented sufficing in vigour and hardiness; though certain

---

Fig. 1.—*Rosa rugosa*.

Fig. 2.

*Tea-rose*; *b*, Hybrid perpetual.
strains have been obtained of some of the leading favourites, such as Jules Margottin and Devenoisie, through "sports" (as it is expressed) of the old kind, which serve the purpose fairly; and under glass or in every snug spot that Coprophylans of yellow roses, *Martha Niel*, the green of *Tea-rose*, and other varieties do best upon *La Giffreare*. But as a rule the *Manetti* is a treacherous foster-mother, affording brief vigour, and encroaching with deceptive suckers. Whatever stock may be chosen, the nobler rose is worked over by budding or grafting, and must engross the entire resources again. Apart from roses there are not a few, of delicate constitution or feeble habit, which should be grown in pots and sheltered through the winter. Many also of the stronger kinds are cultivated thus to bloom in the winter and spring, and some are like value otherwise. But they must have plenty of air and light, and will not endure strong forcing. The *Tea-rose*, *Indica odorata*, descended from the Chinese yellowish rose, is grown most largely under glass in pots or border, and being most lovely in the leaf, is especially fitted for bouquets. *Marthcal Niel* (perhaps more correctly classed as a Noisette of late), *Niphetos*, *Catherine Mermet*, and *Sommervil d'en Ame* are at present most popular for this sweet use.

New varieties of the rose are strongly heralded every year, and every season adds one or two lasting names to the lengthy catalogue. But old friends also pass out of date, and are no longer heard of; sometimes from a real advance upon them, sometimes by their own neglect. About 1860 nearly all new roses were the product of ingenious men; but now we get many quite as good from the skill of our own rosarians. The crossing of the flowers is a process needing both judgment and dexterity. But the general grower will be content to cultivate the established kinds, which require no great trouble. Their abode must not be overgrown, nor beset with stagnant water, the soil should be rich and deeply delved, and well-compacted round the neck of the plant. Plenty of water is given in time of drought, and a mulching of good manure is very necessary; and growth of leaf and bud must be secured from countless enemies by daily and even nightly care. Three-quarters of the buds should be nipped off when true discretion orders it. As soon as the first flush of bloom is past, a little judicious pruning helps the prospect of a later crop; for this reason they should not be much shortening of the branches, unless they are threatened by the wind; but the general pruning remains for March.

See books by W. Paul (9th ed. 1888, with 1886 supplement), Dean Hole (15th ed. 1890), Ellwanger (New York), Tasker (cr. 1840), Shirley Hibbert, Sawyer, and French books by Jannin and Forney, Singer, and others in Lachâme. See also Percommont, Otto of Roses; and for the Roman de la Rose, see France, p. 786. Rose is a name for Erythellea (q. v.).

---

Rose, Sir Hugh. See STRATHNAIRN.

Rosebery, Archibald Philip Primrose, Earl of, was born in London, 7th May 1847, was educated at Eton and at Christ Church, Oxford, and succeeded his grandfather, fifth Earl, in 1868. He entered parliament in 1871, acquired in unusual measure the goodwill of the democracy, and was everywhere welcomed as an effective and entertaining speaker. In 1874 he became president of the Social Science Association, and Rector of Aberdeen University, and in 1880 of Edingburgh University. From 1881 to 1885 he was Under-secretary for the Home Department, and in 1884 became First Commissioner of Works. In Mr Gladstone's next short administration (1886) he was Secretary for Foreign Affairs, an office he held till the full of the government six months later; but even in that short period he established for himself a high reputation. In 1883-84 he visited Australia; and he has strongly supported Imperial Federation. In 1884 he moved for a select committee to inquire how best the efficiency of the House of Lords might be improved. He presented a magnificent swimming-bath to the People's Palace in the east end of London, in token of his interest in all movements for the social improvement of the people. In 1889 he was elected by the City Division to the Liberal Unionist Council, and was successful and assiduous as its first chairman till he resigned in 1890. He was re-elected and acted for a few months in 1892, till the political duties of an approaching general election led to his resignation. In 1892 Lord Rosebery again entered the Imperial Administration, but in 1893 Mr Gladstone resumed office in the Liberal Ministry. Lord Rosebery, as head of the Liberal minority in the Commons, became Secretary for Foreign Affairs, displaying, as on the former occasion, a tact and firmness that secured the approval of all parties. On the resignation of Mr Gladstone in 1894, Lord Rosebery became the head of the Liberal minority in the Commons, and secured the confidence of the various sections of his party. His government lost the confidence of the country, and soon after he resigned a general election (July 1895) returned an overwhelming majority for the new Unionist government of Lord Salisbury.

In 1896, finding his opinions on the Armenian problem more in accordance with those of Lord Salisbury than with Mr Gladstone's, he resigned his leadership of the Liberal party to obtain more freedom in giving expression to his views, and strongly urged that a European war should not be risked on this question, when the Fashoda difficulty with France became acute in 1898 he by his speeches strongly supported the government as expressing the resolution of a united nation; and a large section of Liberals continued to look to him as the future leader of the party. In 1878 Lord Rosebery married a daughter of Baron Meyer de Rothschild (died 1890). In 1891 he published a monograph on Pitt in the "English Statesmen" series. He is keenly interested in Scottish history and Scottish literature, and as president has taken active part in the work of the Scottish History Society. Two addresses in connection with the Burns Centenary were printed in 1896. In 1896 a collection (unauthorised) of his political speeches was published, and in 1899 another of Appreciations and Addresses, dealing with Burns, Burke, London, Town Councillors, &c. The first number of the *Anglo-Saxon* (1899) contained an article by him on Peel. Lord Rosebery keeps an extensive racing stud, and in 1894 and 1895 won the Derby with the horses *Lamia* and *Six Visio*. He is LL.D. (Cambridge, 1888), K.G. (1892), and K.T. (1895), and sits in the House of Lords as Baron Rosebery in the peerage of the United Kingdom.

Rose-chafer (Cetonia aurata), an injurious beetle, whose grubs destroy the roots of straw-
berries and other plants, while the adults spoil the flowers of roses, strawberries, and seed-turnips. The eggs are laid in the ground; the full-grown grubs are whitish and about an inch and a half in length; after two or three years they pupate inside earthen cocoons. The adults, which are well able to fly from place to place, measure about an inch in length, are golden green above, coppery with a tint of rose beneath. Where they are likely to do harm the adults and grubs should be collected and destroyed, and recourse may be had to remedies similar to those used against cockchafers. The ‘rose-bug’ of the eastern United States is another beetle (Macrodactylus subcapitatus), a voracious pest which often appears in immense numbers and destroys the flowers of roseaceous plants.

Rosecrans, William Starke, an American general, was born at Kingston, Ohio, 6th September 1819, graduated at West Point in 1842, and was employed as an engineer until 1854, when he resigned, became a civil engineer, and afterwards engaged in coal-mining and the manufacture of kerosene. In 1861 he volunteered as an aide to General McClellan, won an action at Rich Mountain in July, was commissioned brigadier-general in the United States army, and succeeded McClellan as head of the Department of the Ohio, and kept Lee out of western Virginia. In 1862 he commanded a division at the siege of Corinth, and after its capture was given the command of the Army of the Mississippi; on 19th September he defeated General Sterling Price at Iuka, and on 3d and 4th October he successfully defended Corinth against Price and Van Dorn. From October 1862 to October 1863 Rosecrans was in command of the Department of the Cumberland; in the battle at Stone River (December 31 and January 2), against Bragg, he by his personal exertions converted what nearly had been a defeat into a victory, after each side had lost over 9000 men; but at Chickamauga, September 19-20, 1863, he was defeated by Bragg, with a loss of 16,170, although he held Chattaanooga, and the Confederates lost 17,804 men. Rosecrans was relieved of his command by General Grant; but in 1864 he was placed over the Department of the Missouri, and repelled Price’s invasion of that state. He afterwards received the brevet of major-general, and resigned from the army in 1867. In 1868-69 he was minister to Mexico, in 1881-85 a member of congress, and in 1885 appointed registrar of the U.S. treasury. He died in March 1898.

Rosemary (Rosmarinus), a genus of plants of the natural order Labiate, and nearly allied to Sage (Salvia), from which it differs in its filaments having an awl-shaped tooth, directed downwards a little above the base. Only one species is known, R. officinalis, an evergreen creeper shrub of 4 to 8 feet high, with linear leaves, and pale bluish flowers, growing in sunny places, on rocks, old walls, &c., in the countries around the Mediterranean Sea, and cultivated elsewhere as an ornamental and aromatic shrub. The leaves have a short whitish-gray down beneath, a penetrating camphor-like odour, and a pungent aromatic and bitter taste. They contain a large quantity of an essential oil, Oil of Rosemary, which is not unfrequently used as a stimulating liniment, to promote the growth of the hair, and as a perfume. Spirit of Rosemary, made by distillation of sprigs of rosemary with rectified spirit, is used to give a pleasant odour to lotions and liniments. Rosemary has been advantageously administered internally in cases of chronic diarrhoea, and of a relaxed state of the system.—

Oil of Rosemary is a principal ingredient of the perfume called Hungarian Water. The celebrated white honey of Narbonne owes its reputation to being collected from the flowers of rosemary. In some places, by a confusion of similar names, the totally distinct plant Costmary (q.v.) is called Rosemary. The name Wild Rosemary is given to Ledum palustre, a shrub with narcotic acrid properties.

Rosendale, a village of New York, by rail 8 miles SSW. of Kingston, or 61 miles S. by W. of Albany, has a pop. (1900) of 1840; it is noted for its great manufacture of hydraulic cement. In 1886, when the United States produced 4,500,000 barrels (300 lb.) of cement, nearly one-half came from the Rosendale district, the rest being drawn from Pennsylvania, Kentucky, Illinois, Colorado, Indiana, Tennessee, and Alabama in varying proportions. Most of the American cement is derived from natural cement rock, as at Rosendale; the rest being ‘artificial Portland.’

Roseneath, or Rosneath, a village of Dumfriesshire, on the SW. shore of the Gare Loch, with a palace of the Duke of Argyll. Pop. 2000.

Rosenkranz, Karl, philosopher, a pupil of Hegel, was born at Magdeburg on 23rd April 1805, studied in Berlin, Halle, and Heidelberg, taught at Halle as privat-dozent (1828), and as professor of Philosophy (1831), in 1833 was called to the chair of Philosophy in Köenigsberg, and there he died, blind, on 14th June 1879. He was a man of wide culture and a voluminous writer, his works including Encyklopädie der theologischen Wissenschaften (2d ed. 1845), Psychologie (3d ed. 1855), Kritische
Erläuterungen des Hegelischen Systems (1849), criticisms of Schleiermacher's (1836) and Strauss's Doctrines of Belief (1845), Meine Reform des Hegelischen Systems (1852), and Wissenschaft der logischen Idee (1858–69) in philosophy, and books on the History of Church and International Law (1860), Leben Hegels (1844), Goethe und seine Werke (2d ed. 1856) in literature. He also edited, with Schubert, Kurt's Werke (12 vols. 1838-40).

See his autobiographical Von Magdeburg nach Königsberg (1875) and Life by Quibbeker (1879).

Rosenmüller, Johann Georg, a German theologian, a native of Erfurt, was born at Unna near Hildburghausen, 18th December 1736, studied in Altдорf, and filled chairs at Erlangen (1773), Giessen (1783), and Leipzig (1785), where he died, 14th March 1815. He published about 100 books of great popularity. Of these the most important was Scholia in Novum Testamentum (6th ed. by his son 1815–31).—Ernst Friedrich Karl, eldest son of the foregoing, was a distinguished biblical critic and Orientalist. He was born at Hesseberg near Hildburghausen, 10th December 1768, studied at Königsgen, Giessen, and Leipzig, became extraordinary professor of Oriental Literature at the last in 1795, ordinary professor in Arabic in 1813, and died 17th September 1833. His Institutiones ad fund. ling. Arab. (1818) and Anecdota Arabica (3 vols. 1824–27) were of great importance; his masterpiece, the Scholia in Petrum Testamentum (11 parts in 23 vols. 1788–1835), still retains no small part of its value. Other works are Handbuch für bibl. Kritik und Exegese (1797–1800), Das alte und neue Morgenland (1816–20), Handbuch der biblischen Alterthumskunde (4 vols. 1833–31).—A younger brother, Johann Christian (1771–1829), was twenty years a professor of Anatomy and Surgery at Leipzig, and wrote on anatomy.

Rose-noble. See Noble.

Rose of Jericho (Anastatica hierochuntica), a plant of the natural order Cruciferae, which grows in the sandy deserts of Arabia, and on rubbish, the roofs of houses, and other such situations in Syria and other parts of the East. It is a small, bushy, herbaceous plant, seldom more than six inches high, with small white flowers; and after it has flowered, the leaves fall off, and the branches become incurved towards the centre, so that the plant presents a globular form; and in this state it is often blown about by the wind in the desert. When it happens to be blown into water the branches expand again, and the pods open and let out the seeds. Numerous superstitions are connected with this plant, which is called Rosa Maris, or Rose of the Virgin. If taken up before it is quite withered the plant retains for years its hygroscopic property of contracting in drought and expanding in moisture.

Ross of Sharon, a name given to an ornamental medicinal plant, the Salvia syriaca (see figure). But the Rose of Sharon of the bible was doubtless a bulbous plant, probably a kind of narcissus.

Rose-côl, or Rose-rash, is a name sometimes applied to the milder varieties of Erythema (q.v.), where the eruption consists merely of a reddening of the skin, but is otherwise untreated. Such an eruption sometimes occurs as an early symptom in smallpox, and during the stage of reaction in cholera; it is also one of the commonest of syphilitic eruptions. But it frequently appears independently of any such disease, and is then usually an indication of some internal source of irritation. It usually subsides in the course of two or three days at most, and causes very little constitutional disturbance. Occasionally it is attended by slight fever and sore throat, and may then be extremely difficult to distinguish from a mild case of scarlet fever. No treatment is usually required, but a mild saline lotion (e.g. a seidlitz powder) may be administered with advantage.

Roses, Wars of, a disastrous dynastic struggle which agitated England during the 15th century, from the first battle of St Albans (1455) to that of Bosworth (1485). It was so called because the two factions into which the country was divided upheld the two several claims to the throne of the Houses of York and Lancaster, whose Lancastrian and Yorkist heralds were respectively a lion and a maison. The Lancastrian claim to the crown came through John of Gaunt, third son of Edward III., created Duke of Lancaster in 1362, having married three years before the heiress of Henry, Duke of Lancaster. On John of Gaunt's death King Richard II. seized his lands, whereupon his son Boing-broke, then in exile, returned to assert his rights, and, finding his cause exceedingly popular, was emboldened to claim the crown, which was granted him by the parliament after the deposition of his cousin. As Edward IV. and Richard III. both died, their brother John became last Earl of March, and he was thus the nearest actual heir to Edward III. through his second son, Lionel, Duke of Clarence. The reigning family had become unpopular from its loss of France and its enemies, and Edward IV. was great in the north, where the power of the Percies was alone rivalled by that of the Nevilles. The Yorkist strength lay chiefly in the mercantile population of the southern counties. The effect of the war was the almost complete destruction of the old nobility, the weakening of the power of the church, and an enormous increase in the power of the crown, together with the great advance of the commercial classes and the large towns, destined a few generations later to measure strength with the crown itself. The first battle of St Albans (1455). A second period of insurrection again gave him the protectorship, but the king recovered his crown. His weakness and the collapse of his pretensions proved his undoing, and in 1460 the Yorkist earls of Salisbury, Warwick, and March defeated and captured the king at Northampton (1460). The Lords now decided to grant the reverie of the crown to York, passing over Prince Edward. The queen refused assent, and fled to Scotland, returning only after the death of York at Wakefield (December 30, 1460); but York's son Edward quickly gained a victory at Mortimer's Cross (1461), though Warwick, who defended the king, was defeated and slain in the body in the second battle of St Albans (1461). But London rallied to young Edward, and in June he was crowned at Westminster after the great victory of Towton (1461). Next year Queen Margaret again appeared in the north, but in 1464 her forces were utterly defeated at Tewkesbury, near Tewkesbury, and the last Yorkist pretender, Prince Edward, died at Hedgeley Moor and Hexham. The estrangement of Warwick and his alliance with Queen Margaret's party drove Edward IV. from England and restored Henry VI. But Edward returned in the spring of 1471, defeated Margaret at Barnet, and at Tewkesbury at the battle of Tewkesbury. The murder of Prince Edward after the battle, and the convenient death of Henry VI. in the Tower, cleared away his two chief dangers and left him to reign in peace. The accession of Henry VII. after
the death of Richard III. on Bosworth field (1485),
his marriage with Elizabeth, daughter of Edward IV.
(1486), and the blending of the red and white rose
in the Tudor badge, marked the termination of the
Wars of the Roses, although the reign of Henry,
whose own title was not good, was from time to time
disturbed by the pretensions of Yorkist impostors.

whether it was established in its own name in 1459.
Paracelsus. Usually the least known of the fifteenth
century magicians were, relatively speaking, less
famous than the Rosicrucians. (Strasburg, 1615); Chymical
Mystery and Hermetic Order of the Rosy Cross, published
in 1817, advertised for the first time the existence of
such an association, which then claimed an antiquity of over 200 years. From subsequent
publications it is inferred that the fraternity
was established in England by a certain Sir
Rosencreutz in 1459. On this point there is no
evidence outside Rosicrucian manifestoes, and all
that concerns the founder is of fabulous or allegori-
ical character. If the society existed as a corporate
body when the Fama Fraternitatis appeared, that
date may be accepted as marking at least the
beginning of its public history. The other docu-
ments which claim to have been issued by the
Rosicrucians are Confessio Fraternitatis R.C.,
addressed to the Learned of Europe (Cassel, 1615); Chymical Marriage of Christian Rosencreutz
Strassburg, 1615); Perfect and True Preparatio
of the Philosophical Stone, according to the Secret
of the Brotherhoods of the Golden and Rosy Cross
(Breslau, 1710); contains the unbridged laws of the
order; and Secret Symbols of the Rosicrucians of
the Sixteenth and Seventeenth Centuries (Altona,
1765–88). These publications, the later part of whose
existence from the original society it is not possible to say,
but it has been supposed that associations in imita-
tion of the fraternity, bearing its name and
emblems, were formed soon after the appearance
of the first manifestoes. By these documents the
Rosicrucians are represented as adepts in Hermetic
mysteries, including metallic transmutation, power
over elemental spirits, and knowledge of magical
signatures—the sigillum rerum of Paracelsus.
They aimed at a general reform in arts and sciences,
especially alchemy and medicine, and passed chiefly
as professors of the healing art. They invited all
students of nature to join them; but, as they gave
no clue to their whereabouts, the manifestoes were
by some regarded as a laborious hoax, an opinion
which does not seem justified by a review of the
entire proclamations. An immense controversy took
place at the time of Germany, whose literary
centres became a battle-ground for rival pam-
phleteers on the merits of Rosicrucian pretensions.
The foremost defenders of the order were Michael
Maier in Germany, Robert Fludd, Thomas Vaughan,
and afterwards John Heydon, in England. Among
its adverse critics were Andrew Libavius, who
afterwards changed his standpoint, and Johann
Valentin Andrae (q.v.). The authorship of the
original manifestoes has, at the same time, been
generally attributed to Andrae, and he certainly
wrote the Chymical Marriage of Christian Rosen-
creutz. The question of the authorship offers a
curious field for investigation, and has exercised
the controversial skill of many ingenious critics;
but no satisfactory solution has ever been reached.
Rosicrucians flourished in France during the period of
the French revolution. They were called to the
lodges in Martinist about 1734; and there are traces of such a fra-
ternity at the beginning of the 19th century both
in England and Germany. A Societia Rosicruciana
in Anglia was formed as an offspring of masonry by
Robert Wentworth Little about 1857, which is to
be distinguished from the peculiar Rosicrucian
Principles of the Rosicrucian Order A.C.A. is a
theological society which has sprung

Rosetta, a town of the Nile delta, on the old
Babittic arm, 9 miles from the Mediterranean and
44 miles by rail NW. of Alexandria which
outripped it. In the time of the Crusades it was
a place of great strength; and St Louis made it the
basis of his crusading operations. Sultan Beyars,
who after that (in 1251) founded the present city further
inland. The Arabs call it Rosett; believing that
Haruna al-Rashid founded the old city.

Rosetta, a circular window with tracery,
such as is shown in our illustrations to the articles
Archives and Glass.

Rosewood. The most valuable rosewood
comes from Brazil. Two kinds, or two qualities, are
known in commerce. These much resemble each
other, the one, which is usually rather the better
figured of the two, coming from Rio de Janeiro,
and the other from Bahia. Although Brazilian
rosewood has been used for making furniture in
Europe for more than two hundred years, the
species of tree or of trees which yield it are not
known to European botanists. Mr Bentham, judg-
ing by the appearance of the wood and of the
leaves of the tree, or of one of those rosewood
trees, has assigned it to the genus Dalbergia. This
view is probably correct. At all events there are three
well-known Indian species of this genus called respectively D. latifolia, D. sissu, and D. cultrata,
all of which, except that they want the dark
blotchy veining, closely resemble the Brazilian
rosewoods. The cellular structure of the wood is
similar in the whole of them. They are all rich in
resinous colouring matter, and all except D. lati-
folia, which is slightly lighter, have a specific
gravity ranging between 0.90 and 1.00, so that
they just float in water. Since at least 1830 the
D. latifolia has been known as East Indian rosewood.
The South American and Indian kinds named above are all hard and
durable, and take a fine polish. They are in every way excellent
furniture woods, the Brazilian kinds being only
more valuable because they are more beautifully figured. Indian rosewood
is chiefly carved by native workmen, and for this purpose it
is well suited. Of late years much of the furniture,
even of a superior kind, made of mahogany in
Great Britain, has been stained of a rosewood
colour. An inferior kind of rosewood is brought from Java and the Dutch.

Rosherville Gardens, "the place to spend a
happy day," were formed near Gravesend by Mr
Rosier, the original proprietor, in worked-out
chalk-quarries. Music, a theatre, a zoological
collection, as well as the pleasant neighbourhood,

Rosicrucians. The mystery which has sur-
rounded this brotherhood of Hermetic philosophers
has afforded a wide field to romantic fiction, and
has much exaggerated their own pretensions. A
German pamphlet, Fama Fraternitatis, or
Mercurian Order of the Rosy Cross, published
in Cassel in 1614, advertised for the first time the existence of
such an association, which then claimed an antiquity of over 200 years. From subsequent
publications it is inferred that the fraternity
was established in its own name in 1459. Whether
Rosenercruzt in 1459. On this point there is no
evidence outside Rosicrucian manifestoes, and all
that concerns the founder is of fabulous or allegori-
ical character. If the society existed as a corporate
body when the Fama Fraternitatis appeared, that
date may be accepted as marking at least the
beginning of its public history. The other docu-
ments which claim to have been issued by the
Rosicrucians are Confessio Fraternitatis R.C.,
adressed to the Learned of Europe (Cassel, 1615); Chymical Marriage of Christian Rosencreutz
Strassburg, 1615); Perfect and True Preparatio
of the Philosophical Stone, according to the Secret
of the Brotherhoods of the Golden and Rosy Cross
(Breslau, 1710); contains the unbridged laws of the
order; and Secret Symbols of the Rosicrucians of
the Sixteenth and Seventeenth Centuries (Altona,
1765–88). These publications, the later part of whose
existence from the original society it is not possible to say,
but it has been supposed that associations in imita-
tion of the fraternity, bearing its name and
emblems, were formed soon after the appearance
of the first manifestoes. By these documents the
Rosicrucians are represented as adepts in Hermetic
mysteries, including metallic transmutation, power
over elemental spirits, and knowledge of magical
signatures—the sigillum rerum of Paracelsus.
They aimed at a general reform in arts and sciences,
especially alchemy and medicine, and passed chiefly
as professors of the healing art. They invited all
students of nature to join them; but, as they gave
no clue to their whereabouts, the manifestoes were
by some regarded as a laborious hoax, an opinion
which does not seem justified by a review of the
entire proclamations. An immense controversy took
place at the time in Germany, whose literary
centres became a battle-ground for rival pam-
phleteers on the merits of Rosicruician pretensions.
The foremost defenders of the order were Michael
Maier in Germany, Robert Fludd, Thomas Vaughan,
and afterwards John Heydon, in England. Among
its adverse critics were Andrew Libavius, who
afterwards changed his standpoint, and Johann
Valentin Andrae (q.v.). The authorship of the
original manifestoes has, at the same time, been
generally attributed to Andrae, and he certainly
wrote the Chymical Marriage of Christian Rosen-
creutz. The question of the authorship offers a
curious field for investigation, and has exercised
the controversial skill of many ingenious critics;
but no satisfactory solution has ever been reached.
Rosicrucians flourished in France during the period of
the French revolution. They were called to the
lodges in Martinist about 1734; and there are traces of such a fra-
ternity at the beginning of the 19th century both
in England and Germany. A Societia Rosicruciana
in Anglia was formed as an offspring of masonry by
Robert Wentworth Little about 1857, which is to
be distinguished from the peculiar Rosicrucian
Principles of the Rosicrucian Order A.C.A. is a
theological society which has sprung

Among works to be consulted on the subject of the
Rosicrucian mystery a first place should be given to

Among works to be consulted on the subject of the
Rosicrucian mystery a first place should be given to
Rosmini, a Milotnian village, near the wooded glen of the North Esk, 6½ miles S. of Edinburgh. Its castle, dating from the 14th century, was the seat of the St Clair, Earls of Orkney from 1379 to 1471, and afterwards of Caithness, and hereditary grand Master masons of Scotland from 1435 to 1736. The exquisite 'clapet,' built about 1470, is really the choir of an intended collegiate church, and is only 70 feet long, 35 broad, and 42 high. Its beauty lies not in the outline, but in the projection of stone carving lavished on pinnacles, niches, vaults, roof, and clustered columns, capped and capped on the famous 'Prentice pillar.' The building, essentially Scottish, has often been wrongly ascribed to Spanish, at any rate to foreign, masons. Much damaged by an Edinburgh mob in 1688, it was restored by the third Earl of Rosslyn at a cost of £2000, and has been in use since 1797, as an Episcopal church. On Roslin Moor the Scots are said to have twice defeated the English in one day, 24th February 1303. Pop. 730. See articles by A. Kerr in Proc. Soc. Antiq. Scot. for 1876-78.

Rosmini, ANTONIO ROSMINI-SERBATTI, one of the most original philosophers of the 19th century, was born of noble family at Roveredo in the Italian Tyrol, in 1783. He died a pure and beautiful child, and after a sinless youth of devotion and study decided for the priesthood against his parents' wishes, and began the course at Padua in 1817. Three years later his father's death gave him an ample estate. He was ordained priest in 1821, and devoted the next five years at home with a serene but profound enthusiasm to study, meditation, and prayer. He read widely in philosophy alike ancient and modern, and already revolted within his mind a comprehensive and as it were a supreme system, to serve as a basis for the truths of revelation, while on the practical side he planned a new institution for the training of teachers and priests in wisdom and holiness. From 1826 to 1828 he lived mostly in Milan, next thought out the rule of his new Order in a period of retirement, and severe mortification at Domodossola in the Piedmontese Alps, visited Rome, gained the approval of Pins VIII. both for his special studies and for the institution of his Order, and published his New Essay on the Origin of Ideas (4 vols. 1830), which at once placed his name over the Catholic world. After a few years of labour at Trent, hampered by the jealousies of the Austrian government, which feared his Italian patriotism and his papal sympathies, he settled in 1837 at Stressa on the western shore of Lago Maggiore, and two years later received from Gregory XVI. the formal approval of his Institute. The next few years were the happiest and most fruitful of his life. Surrounded by loved and devoted friends, he sent volume after volume to the press; overpowered by his logic noble opponents to his philosophy like Galvani and Fontana; passed as well as less able writers from the rationalistic and anti-Catholic side, and foiled the restless intrigues of Jesuit enemies, who saw in his enterprise possible dangers to the supremacy of their Order, and brought, according to the Constitution according to Social Justice (1848), was a confederation of the states of Italy under the pope as perpetual president; but his heart sank within him when the pope declared his intention to take no part in the war of liberation against Austria.

For a brief period he backed in the papal favour, and was promised by Pius IX. a cardinal's hat; while for seven weeks he served as the envoy of Piedmont at the papal court, and it was he who the Romans asked for as their Liberal minister in the period before the murder of the much-abused pope's flight to Gaeta. He followed the pope, but now found his mind poisoned against him by the malign suspicions of Antonelli and the reactionary party, and never afterwards regained his confidence. His Constitution and The Five Wounds of Holy Church (1830), ed. by himself, were next prohibited by an irregular meeting of the Congregation of the Index called at Naples. Rosmini submitted without a word of protest, and returned to Stressa to spend the remaining seven years of his life in even more absolute devotion than before to his Institute and to the composition of works intended to complete and consolidate his system of philosophy. His enemies still continued to pursue him with wicked calumnies and charges of heresy in doctrine and unfaithfulness to the Holy See. But when the dignity overhung by its mark, at length the pope, his eyes opened to see how he had wronged Rosmini by his haste, granted him a fair hearing, first enjoining silence on his traducers, and next subjected his whole published works to a careful scrutiny, in relation to the more than three hundred charges brought against them. The process lasted nearly four years (1851-54), but at its close the Congregation of the Index, the pope presiding, declared Rosmini's writings to be entirely free from censure, and enjoined perpetual silence on all without any condition. This was a triumph for which he had waited with sainthood patience, dying at Stressa, not without suspicion of poison, 1st July 1855. It was only in 1888 that Rosmini's restlessly succeeded in getting forty propositions from his posthumous works condemned by the Holy Office.

The Institute of the Brethren of Charity survived its founder, and among the Rosminian Fathers, who are mostly Italians or Englishmen, are to be found at the present day some of the ablest and most devoted among the Rosminians. Its fundamental idea is the principle of passivity, its aim holiness or the moral perfection of the soul. Moral perfection consists in justice or the practical recognition of each being, seen in the idea, according to the beingness that is in it. The elective or contemplative part of the discipline prepares for the assumptive or active part, whose constant aim is the well-being of others. The brethren, who include both clerical and lay members, undergo a two years' novitiate and take the three ordinary vows, but they do no distinctive dress and conform to the laws of the country in which they happen to be. The Institute of Charity was a large-minded attempt to adapt the monastic system and Catholic Christianity generally to the needs of the present day, and its comparative lack of success is only due to the enormous force of interested opposition brought to bear against it by the obscurantist party in the church, whose chief end is despotic power for itself and blind obedience from the people. In England it has foundations at Ratcliffe, Loughborough, Cardiff, Wadhurst, Richmond, and among all the Royal Houses at St Etheldreda's, Holborn, once the domestic chapel of the palace of the Bishops of Ely.

The foundation of Rosmini's philosophy is being considered as the form of the intelligence—an element in mental intelligence composed in himself. He begins by pointing out, as an essential characteristic of cognition, a distinction between the impersonal object known and the personal
subject or known. Human cognitions are intuitions and affirmations, and the former necessarily precede the latter, since they regard things in their possibility, rather than merely formulate assertions as to whether they subsist or do not subsist. Intuitions as possible sensations—i.e., affirmations, things subsistent. Of ideas we may affirm (1) that they are not nothing; (2) that they are not ourselves; (3) that they have a mode of existence of their own, entirely different from that of real or subsistent things, and independent of the bodily senses. The ideas to which the sensations are universality and necessity; for real objects and sensations are always particular, instead of being universal and generic, and every object which involves no contradiction is necessarily possible. These two characteristics involve two others, infinity and eternity; the origin of the idea comes from God, for man does not receive them from the things themselves. The one 

determine and wholly universal idea is that of being or existence; we cannot determine the subsistence of an object until we have the idea of it, therefore per-
certain ideas which by another isolation from all the other elements of the perception by the process of universalisation, through which it may be realised an indefinite number of times. When the ideas are all fully or perfectly determined, they are called concrete; when they remain to a certain extent, they are abstract. The dimensions of the ideas are sensations; these are merely the occasions of its discovery by the intelligence, which can admit that to be possible which the sensation represents as real. By the process of universalisation they form those ideas which are completely determined; by those which are determined only to a certain extent. It is this idea of being which makes intelligence possible; it is the necessary form of human reason, the indispensable condition given by nature herself, the parts of which generate all others. It is cognisable by itself, as otherwise there is nothing else that could make it known; the idea of being gives itself the essence of the thing. Herein is secured the objectivity of truth—the faculty of recognising the essence of things, the foundation of the Absolute, a result of the internal consciousness of man, the logical foundation on which faith and charity may be supernaturally built. Being is incorporeal, independent of space, spiritual, and therefore incorruptible and immortal. It is independent of time; as being in its essence is always being, and as it would be a contradiction in terms for being to cease to be, it is eternal. But since it was united to the soul in time, it must have existed before it, and be independent of it. And thus we reach an Intelligence anterior to human intelligence—an Eternal Mind. This eternal mind is God's, and therefore God exists, and his existence and the immortality of the soul remain the true foundation of morals. But being as intuitively seen by nature merely gives the certainty that God exists; it cannot make God known to us until we are illuminated by a new faculty—an idea of light, the Light of Grace. Thus a necessary place for revelation is found in the essential limitations of man's nature, and this revelation of God is contained in the Gospel of Jesus Christ, which alone can harmonise all the contradictions of the universe.

Rossini's most important work was his contribution to Ideality; his masterpiece is his New Essay on the Origin of Ideality (1828); Eng. trans. 3 vols. (1828-49); and his Psychology (1846-48); Eng. trans. 3 vols. (1848-88), both of which belong to the classics of philosophical literature. Death overtook him before he had completed his great projected work, the Thesagogy (5 vols. 1839-74). A complete Bibliography of his writings, ninety

nine in number, is prefixed by Thomas Davidson to his admirable translation (1882) of the Sistema Filosofico (1845), grouped under the heads of Ideology and Logic, Metaphysical Sciences, Philosophy of Morals and Right, Intuition and Apportionment, Science of Architecture, Ideality, Philosophy of the Supernatural, Ecclesiastical Prose, and Miscellaneous. The last section includes two volumes of Correspondence, as well as a large number of Letters to various friends, besides a brief Life and a Lucid Introduction, a list of books relating to Rossini's Life and Philosophy. Here we may name the studies by Tommaso (Turin, 1856), Franco, Paoli (Turin and Rome, 1846), and the Studies of Lockhart (2d ed. complete, 2 vols. 1886). Rossini's own Sketch of Modern Philosophers and of his Own System has been translated, with an admirable Introduction, by Esther L. L. Tuke (1882).

Rosoglio, a variety of lichen, made in Italy, and flavoured with flowers or fruits, especially orange blossoms.

Ross, a Celtic word, meaning a headland, occurring as the name or part of the name of many places in the British Islands, and in other parts of Europe, as Roslin, Culross, Dunrossness, Montrose, Roxburgh, Ardressan.

Ross, a market-town in Herefordshire, is finely situated on the bank of the River Wye, 5 miles of Hereford. In the parish church (1816), whose 'heaven-directed spire' is 208 feet high, is buried John Kyre (q.v.), celebrated by Pope as the Man of Ross. The town carries on a trade in cider, malt, and wool, has corn-mills and tanneries, and is much visited by tourists. Pop. (1881) 5724; (1891) 5725.

Ross, Sir John, Arctic voyager, born June 24, 1777, was a son of the minister of Inch, Wigtownshire, and was little more than nine years old when he entered the navy, serving with distinction in the French wars. His most important services were rendered in the Arctic regions, whither in 1818 he proceeded with Parry as his second in command; the objects of the expedition were to explore Baffin Bay and attempt a North-west Passage. Ross published the results of his investigations in A Voyage of Discovery (1819). In May 1829 he commanded a fresh expedition to the Arctic regions, with Sir Felix Booth, and discovered the peninsula of 'Boothia Felix.' Ross received, on his return in 1833, the honour of knighthood. The results of this expedition were written down in Narrative of a Second Voyage in Search of a North-west Passage (1835). He made yet another voyage to the Polar regions—his last successful attempt to find Sir John Franklin, in 1850. Ross wrote Memoirs and Correspondence of Admiral Lord de Saumarez (2 vols. 1838), a Treatise on Navigation by Steam (1838), and other works. He died in London, August 30, 1866.

Ross, Sir James Clark Ross, his nephew, also distinguished himself as an Arctic navigator. He was born in London, April 15, 1800, entered the navy in his twelfth year, accompanied Sir John in his first and second Polar voyages, and in the interval between visited the same regions with Parry in his expeditions. He discovered in 1831 the North magnetic pole, and on his return was rewarded with a post-captaincy. After being employed by the Admiralty in a magnetic survey of Great Britain and Ireland, he was placed in command of the Erebus and Terror for an expedition to the Antarctic seas—his first attempt and approach to the South magnetic pole. He was knighted after his return home in 1843; and in 1847 published Voyage of Discovery in Southern Regions, 1839-43 (2 vols. 1847). In 1848 he made a voyage in the Enterprise to Baffin Bay in search of Sir John Franklin. He died at Aylesbury, April 3, 1862. See Mackinder, Ross and the Antarctic (1892).
Rossall College, a large public school on the coast of Lancashire, 24 miles SSW. of Fleetwood, was founded 1815 by the intervention of the sons of clergymen and others. It has two entrance scholarships, thirty masters, and over 330 boys. See the Jubilee Sketch by Canon Beechey (1894).

Ross and Cromarty, a Highland county, the third largest in Scotland, extends from the German Ocean to the Atlantic, and is bounded 30 miles on the south by Sutherland. In 1890-91 it was finally formed into a single county by the boundary commissioners, who also added to it the small Ferintosh (detached) district of Nairnshire, and a much smaller fragment from Inverness-shire. Its mainland portion measures 75 by 67 miles, and the total area is 2,084,900 acres or 3,260 sq. m., of which 103 are water and 736 belong to a dozen islands—the Lewis, Tanera, Ewe, &c. The east coast is indented by the Dornoch, Cromarty, and Moray Firths; the west coast by eight sea-locks (Brochel, Torridon, Carron, &c.).

The chief of the innumerable streams are the Oykel, Ainess, and Conan; the Falls of Glomach, on a head-water of the Elchaig, in the SW. are 370 feet high; and beautiful Loch Maree is the largest of nearly a hundred good-sized fresh-water lakes. Mount Sallhall (3802 feet), on the Inverness-shire border, is the highest of more than thirty summits exceeding 3200 feet above sea-level, others being Ben Dearg (3547), Benmore (3506), Ben Wyvis (3429), and Ben Attow (3383). The high grounds afford good pasture, and systematic sheep-farming dates from about 1784. It reached its zenith during 1860-70, when 400,000 sheep were grazed in the county. The glens and low grounds in the more favoured portions have a fertile soil, which, with the fine climate, especially in Easter Ross, bears crops of superior quality. Still, more than 7 per cent. of the entire area is arable, and less than 70 square miles is occupied by woods and plantations. Whisky is distilled, and the salmon and sea fisheries are very valuable. Montrose was defeated at Invercharron (1650), and a small Jacobite force, under Lord Glengall (1718). Sir Thomas Urquhart, Lord Lovat, and Hugh Miller were natives. The chief places are Dingwall, Tain, Stornoway, Fortrose, Cromarty, Strathpeffer, and Invergordon; and the county returns one member to Parliament. (1801) 56,318; (1831) 92,707; (1851) 78,547; (1861) 77,510.

Rossbach, a village in Prussian Saxony, 22 miles W. by S. of Leipzig and 9 SW. of Merseburg, is celebrated for the victory gained here by the Prussians under Frederick the Great (q.v.) over the combined French and Austrian armies on 5th November 1757. The 'runt of Rossbach' remained for a long time a term of reproach in the French army. The Prussians lost 540 killed and wounded, while the allies lost more than 2700 killed and wounded and 5000 prisoners, among whom were 5 generals and 300 officers, and nearly 70 cannon.

Rosco, William Parsons, third Earl of, an astronomer, was born in York on 17th June 1800, and educated at Trinity College, Dublin, and Magdalene College, Cambridge, where he was placed first in the class in Mathematics in 1822. During the life of his father he sat in the House of Commons as Lord Oxmanton, representing King's County from 1821 to 1834; he succeeded to the peerage in 1841, and was elected a representative peer for Ireland in 1852. He had commenced to make experiments in the construction of field lenses; but he subsequently devoted his powers to the construction of a speculum for the reflecting telescope. Certain defects had hitherto baffled opticians—namely, spherical aberration and absorption of light by the glass; and our casting specula of large size cracked and warping of the surface on cooling; but Lord Rosse succeeded in obviating the last defect, and in counteracting in great part the other two. He began the construction of a great reflecting telescope in 1845; it weighed in all 12 tons, and was mounted in his park at Parsonstown at a cost of £30,000. The first addition to astronomical knowledge made by this telescope was the resolution of certain nebulae into groups of stars; next came the discovery of a number of double stars, and some of the most luminous are now known to exist. The telescope is described in the Philosophical Transactions, in which journal, and in the Transactions of the Royal Society, Dublin, most of his papers were published. Lord Rosse was president of the Royal Society from 1854 to 1861. He died on 31st October 1857, and a statue to his memory was erected in Parsonstown in 1876.

Rossett, an electoral division of north-east Lancashire, in which is Haslingden (q.v.).

Rossetti, Gabriele, an Italian poet and man of letters, particularly concerned in Dantean criticism, was born on 28th February 1783 at Vasto, in Abruzzi Citeriore, then forming part of the kingdom of Naples. His father, Nicola Rossetti, was engaged in the iron-trade of the district; his mother was Maria Francesca Pietrocola. The parents were not in easy circumstances, and had a large family: besides Gabriele, two of the sons attained some eminence, Andrea becoming a canon in the church of Naples, and Domenico being well reputed in letters and antiquities. Gabriele was imbued with notions of more than common ability, and was placed by the local grandee, the Marchese del Vasto, to study in the university of Naples. He had a fine tenor voice, and was sometimes urged to try his success on the operatic stage; he drew with such precision that some of his extant pen-drawings with sepia-ink might readily be taken for steel-engravings; he composed poetry, both written and improvised, and became one of the most noted improvisatori in Naples. The boyhood and youth of Rossetti passed in a period of great political commotion, in which the revolutionary and imperial wars of France. The Bourbon king of Naples, Ferdinand I., was overthrown by the Parthenopean Republic, and again by King Joseph, the brother of Napoleon, and his successor King Joachim (Murat), the emperor's brother-in-law, and Ferdinand had to retire to Sicily. Rossetti obtained an appointment as Curator of Ancient Bronzes in the Museum of Naples, and also as librettist to the operatic theatre of San Carlo: he wrote the libretto of an opera, Giusto Sabino, well received at the court of the Napoleonic sovereigns, and in 1813 acted as a member of the provisional government sent to Rome by Murat. After the restoration of Ferdinand to Naples in 1815 he continued his connection with liberal politicians, and joined the widely-diffused secret society of the Carbonari. In 1820 a military uprising compelled King Ferdinand to grant a constitution on the model of that which had recently been established in Spain. Rossetti saluted its advent in the following imperfect couplet:

Sei pur bella ogli astri sul erme
('Beautiful indeed art thou, with the stars in thine hair').

The good faith of the king was highly dubious from the first, and in 1821 he abrogated the constitution, and put it down with the aid of Austrian troops. Rossetti had been described and persecuted, Rossetti among them. Two verses in one of his lyrics are said to have given...
especial offence to the king—'Ché i Sandi ed i Laveli! Non sono morti ancor!' ('For Sandi and Laveli are not yet dead, the association of Kotskebne and of the Due de Berri'). Rossetti had to escape from Naples with the kindly connivance of the British admiral, Sir Graham Moore, who shipped him off to Malta in disguise of a British naval officer. In Malta he was: soon afterwards he was elected professor of Italian in King's College, London. They had four children: (1) Maria Francesca, born 1827, died 1876 (author of A Shadow of Dante, &c.); (2) Gabriel Charles Dante (see below); (3) William Michael, born 1829 (political writer, and editor of Shelley); (4) Christina Georgina (see below). In London Rossetti lived a studious, laborious, and honourable life, greatly respected by his pupils, and by Italian residents and visitors; he was a man of strong and steady affections and vivacious temper, and still adhered to all his pursuits. In politics he was a vigorous liberal, but more inclined to a constitutional monarchy than a republic; in religion he was mainly a freethinker, but tending in his later years towards an undogmatic form of Christianity. Though totally opposed to the Roman Catholic church, and a man open to all attacks of a paralytic character he died in Albany Street, off Tottenham Court Road, on April 28, 1849. Besides some poems published in Italy, Rossetti produced the following works: Dante, Commedia (the Inferno only was published), with a commentary aiming to show that the poem is chiefly political and antipapal in its inner meaning (1826); Lo Spirito Antipapale che produce la Reformation (The Anti-papal spirit which produced the Reformation)—an English translation also was published), reinforcing and greatly extending the same general views (1832); Idolo e l'Uomo, Satirico ('God and Man, a Satyr'), poems (1832); Il Mistero dell'Amor Paterno ('The Holy of the Heavenly Love of the Middle Ages'), 5 vols., a book of daring and subtle speculation tending to develop the analogy between many illustrious writers as forming a secret society of anti-Catholic thought, and the doctrines of Gnosticism and freemasonry (1840); this book was printed and prepared for publication, but withheld as likely to be deemed rash and subversive; La Beatrice di Dante, contending that Dante's Beatrice was a symbolic personage, not a real woman (1842); Il Veggente in Sotududine ('The Seer in Solitude'), a speculative and partly autobiographical poem in one hundred and forty-nine verses, though clandestinely, in Italy, and a medal of Rossetti was struck there in commemoration; Versi (miscellaneous poems), 1847; L'Arpa Evangelica ('The Evangelic Harp'), religious poems (1848); Rossetti regarding Dante, along with Petrarca and Boccaccio, as one of the Italian authors, excites a great deal of controversy, which still continues in various forms and with varying fortunes. His memory is much revered in his native place, where the house of his birth has been bought by the local council and converted into a museum, and the chief square has been named after him.

DANTE GABRIEL ROSSETTI (or properly Gabriel Charles Dante), elder son of the foregoing, was born in Charlotte Street, Portland Place, London, on 12th May 1828. He was educated in King's College School, London; but, having from his earliest years evinced a wish to become a painter, he was later taught by his intimate friend, the sculptor Thomas Woolner; and his first chief instructor was John Everett Millais and William Holman Hunt, and the sculptor Thomas Woolner; and with these three he founded the so-called Pre-Raphaelite Brotherhood. This was completed by the addition of three other members. The chief incentive to the foundation of this society, and of the school of art which it initiated, was the distaste and disrespect felt by the youthful artists for the poverty-stricken conceptions and vulgar excesses in which most of them were reared in early life, and which are still current in England, mingled with a sincere and reverent delight in those qualities of genuine and spontaneous invention, lofty feeling, and patient handicraft, which had been developed by the European schools of art preceding the culmination of Raphael and his followers. A natural result of this frame of mind was a disposition to realise objective details to the utmost, with a view to the thorough authenticity of the visible means through which ideas are conveyed; but it was a mistake to make the rules of science the guide of all in art; exactness and sometimes a plethora of details, to suppose that the main concern of the associated artists was really with the details, and not with the ideas. The English Pre-Raphaelites wished to exhibit true and high ideals through the medium of true and right idealised details. Two further mistakes have been frequently repeated concerning these artists; first, that they were an offshoot of the 'Tractarian' movement, guided by religious pietism; and second, that they were set going by Mr Ruskin. Rossetti's earliest oil-picture, exhibited in 1849, was 'The Girlhood of Mary Virgin,' his next (1850), now in the National Gallery, 'The Annunciation.' After this he withdrew from exhibiting almost entirely, and his art developed through other phases, in which the sense of human beauty, intensity of abstract expression, and richness of colour were leading elements. He produced innumerable water-colours of a legendary or romantic cast, several of them being from the poems of Dante, others from the Arthurian tradition. Among his principal oil-pictures are the Triptych for Llandaff Cathedral, of the 'Infant Christ adored by a Sun-bright Shepherd and a Dove, set amongst the Elements of the Canticles,' 'Dante's Dream' (now in the Walker Gallery, Liverpool), 'Beata Beatrix' (National Gallery), 'Pandora,' 'Preserpine,' 'The Blessed Damozel' (from one of his own poems), 'The Roman Widow,' 'La Ghirlandata,' 'Venus Astriae,' 'The Day-dream.' He designed several large compositions, such as the 'Magdalene at the door of Simon the Pharisee,' 'Giotto Painting Dante's Portrait,' 'Cassandra,' and the 'Boat of Love' (from a sonnet by Dante); but these failed to carry out as pictures on an adequate scale, partly owing to the fact that he was then overburdened with commissions, and he was forced to execute smaller works, consisting mostly of female half-figures ideal in invention or feeling, and executed in life-size. The early studies of Rossetti in art had not been so steady or systematic as might have been wished. Afterwards, beginning in Paris, he became a great student of history, and won the friendly training from his constant intimate, Mr Ford Madox Brown, the historical painter; but, notwithstanding his passionate impulse as an inventive artist, and his impressive realisation of beauty in art, he never developed those short comings in severe draughtsmanship and in technical method, and some degree of mannerism in form and treatment, have often, and not unjustly, been laid to his charge. Rossetti began writing poetry about the same time that he took definitely to the
study of painting. Besides some juvenile work, and some translations from the German (that of Henry the Loper, by the medieval poet, Hartmann von der Aue, is preserved), he executed a number of translations from Dante and other Italians, published in 1861 as The Early Italian Poets, and again in 1874 as Dante and his Circle. Two of his best-known original poems, The Portrait and The Ballads, were written in his nineteenth year, and many others followed. These were about to be published in 1862 in a volume (some of them having been previously printed in magazines—chiefly in The Germ, 1830, and The Oxford and Cambridge Magazine, 1836), but a domestic calamity and ill health prevented publication, and it was set aside for some years. Rossetti had fallen in love towards 1851 with a very beautiful girl, a dressmaker’s assistant, named Elizabeth Eleanor Siddal; he married her in 1859, but she died suddenly in February 1862. In the first impulse of desolation he buried his MSS. in her coffin. In 1869 he thought fit to recover them, and in 1870 he issued his volume named Poems, containing the bulk of those compositions and several others written not long before the date of publication. The poems were received with great eagerness, and was reviewed with great admiration and even enthusiasm by some leading critics. Late in 1871, however, Mr Robert Buchanan, writing in the Contemporary Review under the pseudonym of Thomas Maltrith, attacked the book on literary, and more especially on moral, grounds; and soon afterwards he republished his article, The Fleshly School of Poetry, as a pamphlet. Rossetti was now in a depressed state of health, suffering much from insomnia, from an abuse of alcohol as a palliative, and from the constant care (he often thought he would become blind, as his father had very nearly been). The literary detraction, conspiring with physical malady, produced a strong and exaggerated effect upon him; and from about the middle of 1872 he became morbidly sensitive and gloomy, and very reclusive in his habits of life, though his naturally strong sense, and his turn of mind, in which a good deal of humour and practicality was blended with idealism, continued to form a substantial counterbalance. In 1881 he published a second volume of poems entitled Ballads and Sonnets, a collection of some of his finest work, Rose Mary, ‘The White Ship,’ ‘The King’s Tragedy,’ and the completed sonnet-sequence, ‘The House of Life’), and at the same time he re-issued, with some omissions and interpolations, the Poems of 1857—1870, his second volume being by this time extremely shatted. A touch of paralysis afflicted him towards the end of 1881, and, rotting in the hope of some improvement to Birchington-on-Sea, near Margate, he died there of pneumonia on 9th April 1882. The poetry of Rossetti is intense in feeling, exulted in tone, highly individual in personal gift, picturesque and sometimes pictorial in treatment, and elaborately wrought in literary form. These characteristics are sometimes made consistent with simplicity, but more generally with subtilty, of emotion or of thought. As in his painting, there is a strong medieval tendency. It is not generally allowed that Mr Buchanan’s charges of immorality against the writings were wide of the mark; indeed, he himself has admitted and proclaimed as much. Rossetti was intimate at one or other period with many of the most poetical men of the day. In politics he took no part. His religious views were vague—at times negative enough; but he had a strong sense of reverence, and a tendency to superstition rather than distinct faith. In person he was of middling height, with a handsome, expressive physiognomy, more Italian than English. His portrait, a pencil-drawing executed by himself towards the age of eighteen, is in the National Portrait Gallery. He was generous, untrite, warm-hearted, not discursive, not habituated to the natural and unaffected manner, concentrated in aims and modes of work. In almost all companies in which he mixed he assumed and preserved a marked ascendency, due to his exceptional faculty and uncompromising tone of mind and character.

CHRISTIN GEORGINA, the younger daughter of Gabriele and Frances Rossetti, was born in Charlotte Street, Portland Place, London, on 5th December 1830. She was brought up entirely at home under her mother’s tuition, as a member of the Anglican Church. She was a writing verse in early girlhood. Before she was seventeen a little volume of her poetry was privately printed by her maternal grandfather, Gaetano Poldi, who kept a printing-press for his own convenience at his residence in London. Her publications are Goblin-Market and other Poems (1862), The Prince’s Progress and other Poems (1866), Sing-song (1872), A Pageant and other Poems (1881); and, in prose, Commonplace and other Stories (1870). Speaking Likenesses (1874), and Tales from Byron (1882). In 1891, Miss Rossetti, whose health was weak, died 29th December 1894. She had lived a very secluded life, divided between devoted attention to her mother (who died at a very advanced age in 1886), and earnest religious thought and practice. In direct poetical gift it is not of a high order of poetry. She may have been as finely equal to her brother Dante Gabriel, although the outcome is of a less conspicuous kind. Her poems have a singular degree of grace, delicacy, and spontaneity, deep in feeling, sensitive and certain in touch, and marked by great purity of emotional thought, and by an unfailing instinct of style. Several of her lyrics have been set to music, and cantatas for two of the longer poems—Goblin-Market and Songs in a Cornfield—were composed by Agilea and Macfarren. See her Life by Mackenzie Bell (1899).

As to Gabriele Rossetti, various critical articles regarding him, more especially discussing getting his laws concerning Dante, &c., will be found in contemporary periodicals, and in some volumes: the work of Arons, entitled Dante, and Dante, Adante, et Societatis (1854), is founded chiefly on Rossetti’s researches, which he presents in an exaggerated form. As to Dante Gabriel Rossetti, see William Sharp, Dante Gabriel Rossetti, a Record and Study (1882); Hall Caine, Recollections (1882); Joseph Knight, Life of Dante Gabriel Rossetti (1887; ‘Great Writers’ series); William Rossetti, Dante Gabriel Rossetti as Designer and Writer (1899); the article by Theodore Watts in the Encyclopaedia Britannica; the monograph in the Portfolio by F. G. Stephens (1894); and the Memoir and Family Letters (2 vols. 1895) by his brother William Michael (born 1829), author of the above article, who has also published the following books: Dante’s Comedy, the Heli, blank verse translation (1865); Fine Art, chiefly contemporary (1867); Lives of Famous Poets (1878); Life of John Keats (1887); Shelley’s The Fortunate Franklin (Clemens Press, 1891); annotated editions of Shelley and of Dante Gabriel Rossetti (2 vols. 1886), and other writings.

Rossi, pellelorino, was born of a noble family at Carrara, 13th July 1787. He studied at Bologna, and was made professor of Law there at twenty-five. Exiled after the fall of Murat, he obtained a chair at the Sorbonne, and was author of his Traité de Droit Pénal. In 1833 Louis-Philippe called him to Paris, and appointed him professor of Political
Economy at the Collège de France. For his Cour d'E ducatino dionnel (1836) he was naturalised and made a member of the Chamber of Peers. He was sent also to Russia as ambassador in 1845, and there witnessed all the events of 1848, having tiged to become an Italian subject after the fall of Louis-Philippe. When called to the ministry by Pius IX, Rossini strove to oppose the party favourable to the House of Savoy, and devised an alliance with Naples, his object being a confederacy of Italian princes with the pope as paramount. This roused the hatred of the Romans, and Rossini was stabbed to death by an unknown hand on the 15th November 1848.

Rossini, Gioacchino Antonio, Italian operatic composer, was born at Pesaro, on the Adriatic, February 29, 1792, and was the only child of Giuseppe Rossini, town trumpeter and inspector of slaughter-houses, from whom he inherited his brightness and humour. From the age of seven he studied music and singing at Bologna under various masters, till in 1807, after having appeared as conductor of the local Academia dei Concordi, he entered the Bologna Liceo, or conservatorium. He soon became known in neighbouring towns as accompanist at the theatres, travelling along with his father, now a horn-player. Numerous operatic works, mostly successful, were written for the Bologna Liceo, the opera of 1812, La Pietra di Pacagnone made a great impression, and gained the composer exemption from the French conscription. Next year Turandot, at Venice, created the wildest excitement, which soon spread over Italy. After producing several other works, now mostly forgotten, he was appointed musical director of the San Carlo and Del Fondo theatres at Naples. On February 5, 1816, he brought out at the Argentino theatre in Rome II Barbieri di Siviglia, founded on Beaumarchais' play, and written in thirteen days. From the predilection of the Romans for the aged Paisiello, who had written an opera on the same play, and from a series of ludicrous accidents, it resulted on the first night in a complete fiasco; but next night, after the first act had been fairly heard, the public found the enthusiasm proceeds Concondi, who became Rossini's house, and conducted him to the theatre in triumph; and its popularity increased with each succeeding representation. Of all his works it has the prospect of most lasting vitality, and in its complete accord with the libretto is the most perfect as a whole. Observed in it is the marked advancement in the style of serious opera, but was not at first successful; the tragedy was too sombre. The comic Cenerentola, in 1817, was favourably received in Rome, and immediately thereafter La Gazza Ladra obtained a triumph at Milan. These were rapidly followed at Naples by Armida and Mosè in Egitto (1818), la Donna del Lago (1819), and Mosè in Egitto (1820). In 1821 he married Isabella Colbran, who had sung frequently in his opera, and the two proceeded to Vienna, where his innovative personality carried all before him, in spite of the venetian bitter opposition. After his return to Bologna, Semiramide was written in 1823 for the Fenice Theatre, Venice; but though, or greatest, or at least the most advanced, of his Italian works, it had only a lukewarm reception. It was the Venetians, invited to London, he and his wife on their way thither paid their first visit to Paris, where he had so cordial a reception that he resolved to return. In England he was welcomed with the greatest favour by the king and the aristocracy, but received no new work, though much was said of an opera intended for the King's Theatre.

On his return to Paris he entered on the duties of director of the Théâtre Italian for eighteen months; and, though not exactly the man for such a post, he had the credit of engaging several famous singers, and produced some of his already written operas, as well as many that were new, including The Barber of Seville, which was produced at the English Court. On August 3, 1829, his greatest work, Guillaume Tell, conceived and written in a style entirely different from and superior to that of his Italian operas, and more nearly conforming to modern dramatic ideas. Its success was immediate and immense, but, chiefly, owing to the wretched libretto, not lasting. From this period till his death his pen was scarcely more than once again resumed; except a few trifles, its only product was the Stabat Mater, first given in 1841, highly attractive and always popular, but little in keeping with the majestic sadness of the subject. After the decision, in his favour, of a tedious lawsuit, he retired in 1836 to Bologna, to comfort the last years of his father, and to bestow the utmost care on the Liceo, which he raised to a high position as a school of music. His wife died in 1845, and in 1847, after he had married again, for the last time, Rossini went to Florence. In 1855 he returned to Paris, and in his villa at Passy became one of the most noted and personalities of the capital. He died there, November 13, 1868. He stands at the head of Italian composers for the stage, though Verdi now far outstrips him in popularity and greater dramatic force and passion, and though only a few of his operas still hold the field—above all, the Barber, Semiramide, and William Tell. His early works would now sound strangely old-fashioned, but he led the way in reform and progress, from ideas. While all his improvements had been elsewhere anticipated by Mozart, and some of his devices were very transparent and soon became hackneyed, the taste of the audiences for whom he wrote must not be forgotten in estimating his work. In his years of old age, he showed an inexhaustible facility in creating melodies which at once delighted the ear—an unequitable possession, the first requisite of a great composer; and though he did not use all the means available in his art, the splendid results he obtained are perhaps on that account more marked.

See the biography by H. S. Edwards (1859), the same author's shorter Life in the "Great Musicians" series (1881), and the more extensive French work of M. Arvedo (1865). There are also works on Rossini by Montrond, Zandonini (1870), and Sittard (1882).

Rosso Antico. See Porphyr.

Ross-shire. See Ross and Cromarty.

Roster (corrupted from Register) is a list of individuals or corps, kept by officers of the army to ensure the allotment of duties in proper rotation. Thus officers are detailed in turn for guard, court-martial, or other duties, according to the district, garrison, or regimental roster. Regiments, battalions, and batteries take their turn of foreign service according to the adjutant-general's roster.

Rostock, the most important town of Mecklenburg-Schwerin, and one of the busiest ports on the Baltic, stands on the Warnow, 7 miles from its mouth and 60 miles by rail N.E. of Schwerin. It consists of the city proper, surrounded by promenades on the island of Rostock, and the suburbs which have grown up beyond them. It has busy fairs for wool, horses, and cattle; imports coal, wine, herring, petroleum, groceries, timber,
&c.; exports grain, wool, flax, and cattle; owns a mercantile fleet of 750 vessels of some 150,000 tons, and is entered annually by more than 900 vessels of about 120,000 tons. Vessels above 200 tons unload in part at Warnemünde, at the mouth of the river. The industries are very varied, the most important being shipbuilding, the making of machinery, tanning, brewing, distilling, the manufacture of hats, tobacco, &c. The university, founded in 1418, but rebuilt in 1867, is the chief of the public institutions; it has 40 teachers, 300 students, a library of 140,000 volumes, an observatory, and an experimental agricultural colony. Amongst the churches are St Mary's (1398-1472), one of the finest Gothic churches of north Germany, in which is a monument of Grotius, and St Peter's, with a tower 414 feet high. The ducal palace (1702) and the 14th-century Gothic town-hall also deserve mention. There is a handsome public park. The statue of Blicher, a native of the town, adorns one of the squares. Pop. (1875) 34,172; (1890) 44,388. Rostock, an ancient Slav town, was burned to the ground by Walthemar of Denmark in 1525. Among other things, it is known to posterity by the fact that this time it enjoyed great repute as a powerful member of the Hanseatic League, and secured important rights of self-government. It still possesses a thoroughly republican municipal constitution, and forms a separate estate in the Mecklenburg Assembly. See history by Köppmann (Rostock, 1887).

Rostoff, (1) a town of south Russia, stands at the head of the delta of the Don and on the railway (1875) from Moscow to the Caucasus. It owes its origin to the foundation of a fortress here in 1761, since when the progress of the town, owing to its advantageous situation, has been remarkable. Pop. (1881) 44,500; (1885) 61,256. It exports corn, linen, and wool to the value of £3,000,000 a year; its imports only reach £30,000. The manufactures are growing rapidly; the principal articles produced being ropes, tobacco, macaroni, soap, and leather; but here are also shipbuilding-yards, wool-cleaning establishments, and caviare-factories. Two important fairs are held here every year.—(2) One of the oldest towns of Russia, stands on a small lake, 120 miles by rail from Moscow, and possesses marbled gardens, a large fair, an extensive trade, tallow-works, and coarse linen manufactures. Pop. 11,998.

Rostopchine, FEODOR VASSILIEVICH, COUNT, a Russian general, was born in the government of Orel, March 23, 1783, and entered the Russian military service as a lieutenant in the Imperial Guard. He won great influence over the weak mind of the Emperor Paul, who promoted him to various offices in rapid succession. In May 1812 the Emperor Alexander appointed him governor of Moscow. He it was, according to the French writers, who plotted and began with his own hand the burning of Moscow. But in 1823 he published La Vérité sur l'Incendie de Moscou (Paris, 1823), in which he rebuts the charge, affirming that this action was due in part to a few of the inhabitants, and in part to the violence and negligence of the French. He was summarily called to answer for this, and not unusually called this denial and admitted his share in the burning, in that he at least set fire to his own mansion-house. He died at Moscow, January 30, 1826. His works, which include a number of historical memoirs, two comedies, and a Russian translation of Molière, was published at St Petersburg in 1853. See life by Schnitzler (Paris, 1863) and by Séguir (Paris, 1872).

Roswitha, or Hrotswita. See DRAMA, Vol. IV, p. 83.

Rot. See Fluke, Dry Rot.

Rotation. When all points of a body are moving with the same velocity (q.v.) the motion is one of pure translation, and is easy to comprehend. When, however, this condition is not fulfilled there must exist the kind of motion known as rotation. As simple examples, take the whirl of a flywheel or the motion of the hands of a watch. In such cases we readily see that there is, in the rotating body, a row of points which does not itself move. This row of points is called the axis of rotation, and every other point in the body describes a circle about it. To specify the motion completely we know not only the position of this axis, but also the rate of rotation and the sense, clockwise or counterclockwise, with which the body is rotating about the axis. The rate of rotation may be measured by the number of revolutions made in a chosen time. It is more scientific, however, to measure it in terms of the angular speed. If the body is rotating uniformly the angular speed is the angle described in unit time by any plane drawn in the body parallel to or containing the axis of rotation; e.g. with the sidereal day, the earth's angular speed about its axis is 2t or 360°; but with the second as the unit of time the angular speed is a quarter of a minute of arc, or 000073 in radians.

In a simple geometric way a given rotation may be represented by a directed line taken of length numerically equal to the angular speed, and drawn along the axis of rotation in that direction which is related to the sense of rotation exactly as the to-and-fro motion of a right-handed screw is to the rotational motion of the screw. Such a directed quantity of definite length and of definite line position is called by Clifford a rotor. It is a Vector (q.v.) under the restriction that its lie in space is limited to a particular straight line.

So long as the axis of rotation is fixed with reference to lines which appear steady to us, there is no difficulty in apprehending the character of the motion. Take, however, the case of a carriage wheel or boy's hoop rolling along the road. Here we may regard the wheel as rotating about an axis drawn through the centre, while the axis is at the same time moving forward with a definite linear speed—in, i.e. we may regard the motion as a combination of translation and rotation. In this particular case we may, however, represent the motion at each instant as one of pure rotation about an axis coinciding with the line of contact of the wheel with the road. For, with rolling and no slipping, this line of contact with the road is for the moment at rest. And it is almost self-evident that, if at any instant there exists in right connection with a moving body an axis momentarily at rest, the instantaneous motion must be of the character of a rotation about this axis. The above is a simple example of what holds generally in uniplanar motion—i.e. motion in which every point of the body moves in a plane perpendicular to the fixed axis. The general theorem is that any uniplanar displacement whatever (which is not a pure translation) can be effected by a pure rotation about a determinate axis. Since any given motion may be regarded as consisting of a succession of displacements, it follows that any such uniplanar motion can be effected by a succession of rotations about instantaneous axes whose successive positions in space and in the body are determinate.

In uniplanar motions generally it is clear that the instantaneous motion, however much it may move both in space and in the body, must always remain parallel to the same direction. If discontinuous motion be excluded—and all natural motions are continuous—this instantaneous axis
will pass continuously from position to position. It will trace along one or more surfaces, real or imagined, one in the body; and at any given instant these surfaces will touch along the line which is for the moment the instantaneous axis. It is not difficult to show that the complete motion of the body may be represented by the rolling of one of these surfaces upon the other. In the simple case of the carriage wheel the rolling surfaces are evidently the circumference of the wheel and the plane of the road. These theorems in uniplanar motion have many interesting applications in the kinematics of machinery (see Minchin's Uniplanar and Conical Rotation, Longmans, Green Press).

If the motion is not uniplanar it is no longer possible in general to represent it by a succession of pure rotations. There is, however, a very remarkable theorem, which can be proved without difficulty, but which is hard of apprehension and even of acceptance. It is that after any displacement whatever of a body in space there is, in the body or rigidly connected with it, a line of points which is simply shifted along its own line in space. The whole displacement may then be effected by means of a sliding along this line. In other words, by a definite screw motion with reference to this line as axis (see Screw). Even in the simpler case, when by fixing one point of a body we quite exclude translation, it is not easy to grasp the significance of the fact that after any displacement whatever of a body there is a line of points which occupy exactly the same positions as before the displacement. From this theorem it follows that, however such a body may be moving, there is momentarily a line which is at rest. This line is the instantaneous axis of rotation. It always passes through the point of support, and will as it shifts in time describe two conical surfaces, one in space and the other in the body. Any given continuous motion can then be effected by the rolling of one determined conical surface fixed in the body upon another fixed in space.

As an ordinary spinning-top. Here to the eye there is in general a rotation of the top about its axis of figure, while at the same time the top executes a conical motion about a vertical line through the point of support. In reality, however, at any instant of time the top is subject to a rotation about an instantaneous axis, which coincides neither with the axis of figure nor with the vertical line. This instantaneous axis executes a definite conical motion, both in the body and in space.

Clerk-Maxwell (see his collected papers) devised a very ingenious and simple optical method for observing the position of the instantaneous axis, and so studying experimentally its motions with reference to the top. It should be mentioned in conclusion that infinitely small rotations are resolved and compounded according to the same laws as velocities and forces; and that we may regard the instantaneous angular velocity of a rotating body as made up of component angular velocities about any three chosen axes. It is thus that the subject is usually treated analytically. Such a treatment, however, is essentially artificial; and for practical treatment we must go to geometry or to the Calculus of Quaternions (q.v.).

**Rotation of Crops.** In successful tillage farming it is a fundamental principle that the various crops shall be grown in a well-considered rotation. There are solid reasons for this. The plants, like the animals, of the farm differ much in their habits and culture; and the periodical mixture of food upon which they subsist. Although all plants tend to exhaust the soil, they do so in widely different degrees; they withdraw from the soil different kinds and quantities of ingredients. Some of the farm crops have long, penetrating roots, which draw nourishment from the deeper layers of the soil; others have short or spreading roots, which ramify near the surface. Certain crops occupy the ground for a much longer period than others; some encourage the growth of weeds or interfere with the proper cleaning of the land; others facilitate the work of eradicating weeds; and finally, the crop residues of the various plants of the farm differ greatly. A glance at the following figures, giving the average weight of the principal ingredients removed (per acre in lbs.) from the soil by the leading farm crops, will show the importance of growing crops upon a carefully-considered system of rotation.

<table>
<thead>
<tr>
<th>Nitrogen, Potash, Lime,</th>
<th>Phosphate, Sulphur, Acid.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat (30 bushels)</td>
<td>25.8</td>
</tr>
<tr>
<td>Barley (40 bushels)</td>
<td>45.5</td>
</tr>
<tr>
<td>Oats (45 bushels)</td>
<td>55.4</td>
</tr>
<tr>
<td>Sweden (21 tons)</td>
<td>163.3</td>
</tr>
<tr>
<td>Turnips (17 tons)</td>
<td>112</td>
</tr>
<tr>
<td>Mangoes (22 tons)</td>
<td>147</td>
</tr>
<tr>
<td>Potatoes (13 tons)</td>
<td>90</td>
</tr>
<tr>
<td>Beans (30 bushels)</td>
<td>50</td>
</tr>
<tr>
<td>Clover hay (2 tons)</td>
<td>102</td>
</tr>
<tr>
<td>Meadow hay (2 tons)</td>
<td>102</td>
</tr>
</tbody>
</table>

It is thus obvious that by alternating the root, the cereal, and the grass and clover crops the power of supplying the soil with the substances that the crops need to grow well is increased. The fuller knowledge which is now available both as to the wants of the plants and the means of supplying these wants, it is possible that such an alternation will be practicable, for the farmer to grow with success the same kind of crop on the same land year after year for almost any length of time. A more economical method, however, is to alternate the crops, so that the natural resources of the soil and the repairing influences incident thereto are not entirely lost, and in certain cases, especially in the more fertile and valuable soils, to use the power of conserving that accumulated nitrogen in a form in which it is easily made available to a crop of grain. Polar points often insufficiently considered in tillage farming are the rotation in the growth and in the rotation of the crops which occupy the ground at certain times during which the crop occupies the ground. Judging from the table given above, one would imagine that turnips would require in the form of manure far more nitrogen than is required for wheat. In practice, however, it is well known that exactly the reverse is the case, that nitrogen is used in greater quantities by root crops than by field crops. As a rule the nitrogen is furnished by the crops grown during the winter, and is returned to the soil during the spring and summer; hence the necessity of growing crops which will supply nitrogen to the soil, a high and increasing rate of fertilizer. Many rotations are based upon the Norfolk or four-course system, which consists of (1) clover or
mixed grass seeds; (2) wheat or, in many parts of Scotland, oats; (3) turnips, swedes, mangolds, potatoes, or bare fallow; (4) barley. The details of this system are generally as follows. The clovers or grasses are sown or grazed, when once they are either used green or are dried for hay; the second crop is carted home for the cattle or horses; near towns it is sold off; or it is consumed on the ground in racks by sheep, which on most highly cultivated farms, make a daily contribution of cake to the manure. In districts where the town-manure can be obtained a top dressing is applied as soon as the first crop of grass is cut. On the poor and worse cultivated soils the grass-crop occasionally remains down for two, or even three years, thus extending a fallow. Certain crops are also grown, viz. the clover and manured and deeply ploughed: the grubber and harrows, in April or May, suffice to prepare for the drilling of mangolds or swedes. Heavy land, intended either for roots or barley, should, in spring, be disturbed as little as possible. In Scotland, and the cooler moist districts of the North and west of England, turnips and potatoes are grown on raised drills or balks, in which the manure lies immediately underneath the plant. Frequent horse and land hoings should ensure the thorough loosening of the soil in the neighbourhood of towns, where it is greatly more profitable to sell off the whole of the root-crop, part of the swede or mangold crop is taken home for the cattle, and the remainder consumed by sheep in the field. After the fallow or cleaning crop another clover or barley is grown, under the Norfolk system this is generally barley, with which the clovers or seeds are sown out. Where sewage or tank water is available Italian rye-grass is often used, and on land in high condition early large and repeated cuttings of grass are made. Wheat and barley are, however, much less frequent than formerly, being now confined to the most refractory of clays, or to subjects that are so hopelessly full of weeds as to require for their extirpation several weeks of summer weather, and the repeated use of the steam or horse ploughs, the scarifier, grubber, and harrows. In such circumstances winter vetches are often put in during September, and are often off by sheep and horses in June or July, and the land afterwards cleaned: this practice is extensively pursued on the heavier lands in the midland and southern counties of England. In such localities the following system is approved of: (1) The clover lapse are seeded with (3) wheat; then come (2) beans, pulse, or vetches, manured, horse or hand hoed; (4) on good land wheat succeeds; (5) oats or barley often follow, but, to prevent undue exhaustion of plant-food, this system requires considerable outlay in artificial manures, cake, and corn; (6) a fallow, or fallow crop, chiefly and root-crop, usually manured, and well manured, comes to restore the cleanliness and fertility; (7) barley or wheat is drilled, and amongst this the clover-seeds are sown. On the heavier closer-lands in Scotland the following plan of cropping is usual: (1) Clover; (2) oats; (3) beans; (4) wheat; (5) root-crop, usually including a considerable breadth of potatoes; (6) wheat; (7) barley, with which the clover or mixed grasses are sown. Under this system it is difficult, with so few cleaning crops, to keep the land clean; roots, besides, are not encouraged; this is chiefly made up to supply either cattle or sheep during the winter. To remedy these defects roots may be introduced after the oats, and would be followed either by wheat or barley. This extends the rotation from seven to nine years.

In neater or better cultivated districts, whether of heavy or light land, stock-farming is extending, and a more vigorous effort is being made to raise the fertility of the land. Root-crops are accordingly more largely grown; indeed, it is sometimes found necessary to sow, not by the old method of broadcast, but where there is land to spare, by drills, thus, after turnips, swedes, cabbages, or mangolds, well manured from the town or farmyard, and eaten off by sheep, potatoes of superior quality are produced with one ploughing and a dose of portable manure. Specialities of management occur in almost every locality. Near London, and in other southern districts, early potatoes or peas are grown for market, and are immediately followed by turnips. In many parts of England, where the soil and climate are good, rye or vetches sown in early autumn are cultivated in early summer, and a root-crop then put in.

Good rotations do not necessarily ensure good farming; they are merely means to an end. As to agricultural education and enterprise extend fixed rotations will be less regarded. The market-gardener, who extracts a great deal more from his land than the farmer has hitherto been able to do, does not adhere to any definite system of cropping. If the farm is kept clean and in improving condition there can be no harm in growing whatever cereals or root-crops it is possible to plant, provided that the latter are requisite during only the three or four last years of a tenancy. The restrictions found in some agreements, preventing the growth of clover for seed, flax, and even potatoes, are inadmissible. Equally objectionable are clauses against the sale of particular sorts of produce, such as hay or roots. The farmer, if he is fit to be entrusted with the use of the land, ought to be permitted to grow or sell off any crop he pleases, provided an equivalent in manure be brought back. On well-cultivated land, in good condition, it is now the practice of the best farmers to take oats or barley after wheat; indeed, some of the best maturing barley in Essex, on the Scottish carse-lands, and elsewhere is now grown after wheat. The frequent growth of cereals, and the heaviest of hay and root-crop, are made by the farmer, may be fairly compensated for by judicious and liberal treatment with town-dung, sewage, or artificial manures. The plant-food disposed of in the more ordinary sales of the farm is economically restored by the careful management of land, even when removed from the farm, by the application of soda, or by keeping plenty of stock on the farm, and supplying them liberally with cake and corn. See also the articles AGRICULTURE, FALLOW, MANURE, SOILS, and those on the various crops. Rotatoria, or Rotiferia, a class of minute aquatic animals, popularly called wheel-machines. Most of them are microscopic, very trans-
Hydatina scuta; 
\[ a, \text{female dorsal view;} \quad b, \text{male ditto.} \]
\[(The \text{ Rotifer, Hudson and Gosse.)}\]

of the eggs, which can remain for a long time quiescent. There are three kinds of eggs—small oval, which develop into males; thin-shelled summer oval; and thick-shelled resting or winter oval. And it is said that a given female produces only one kind. Sometimes they are laid in the water, or attached to water-plants; sometimes they are hatched within the mother. In most, if not all cases, the sexes are parthenogenetic, developing without fertilisation. For in one series of rotifers (Philodinae) the females have never been found; while in other cases the males, which are usually smaller and simpler than the females, do not succeed in fertilising the eggs. As representative rotifers the following may be mentioned: Rotifer vulgaris, very common in stagnant fresh-water pools; Hydatina scuta, with exceedingly rapid development; Melicaeta, which forms an ensheathing case of disengaged pellets; the parasitic Sisson, Albertin, Balataro, which have lost, or almost lost, the characteristic ciliated wheel; Floscularia, living in a gelatinous case; the exceedingly beautiful Stephanoceros; Pedalion mirum, a unique jumping rotifer, with six long leg-like appendages. The zoological position of rotifers is uncertain, but some regard them as remotely allied to Chordopoda worms.


Rotche, or Little Auk. See Auk.

Rothausen, or Rothamstead Park, 4 miles N.W. of St Albans, is noted as the scene of the agricultural experiments of Sir J. Bennet Lawes. See Agriculture, Vol. I. p. 103.

Rothe, Richard, one of the greatest speculative theologians of Germany, was born at Posen, 28th January 1779. At the universities of Heidelberg and Berlin he had among his teachers Danh, Hegel, Schleiermacher, and Neander. After a two years' course in the clerical seminary at Wittenberg and a short period of lecturing as privat-doent at Breslau he set out for Rome in December 1823 as chaplain to Bunsen's embassy. In 1828 he accepted a professorship in the Wittenberg seminary, whence in 1829 he migrated to Apollinaris and in 1837 to Heidelberg. In 1849 he accepted a call to Bonn as professor and university preacher, but in 1854 he returned to Heidelberg as professor of Theology and member of the Oberkirchenrat, and there he died, August 26, 1867. Rothe was one of the noblest types of the theologian that Germany has produced, in his rare combination of simple inward piety with fearless boldness of thought. The patient care he lavished on a wife afflicted with a mental malady, the great personal influence he exerted over his students, his humility, charity, and that magnificent prophetic optimism that already saw the whole universe aglow with the glory of the Redeemer, all testify alike to the beauty and elevation of his character. His conception of the kingdom of God founded by Jesus reminds an English reader of the grand scheme of Huxley and Hore-Belisha. In his identification of the social and moral functions of church and state, in a kind of refined and glorified Erastianism. Indeed the special function of the church will come to an end as soon as the state has become permeated with the religious view, its purpose being only that of a temporary instrument in the establishment of this ultimate ideal. The real end of Christianity is to create no hierarchical theocracy, but a spiritualised community with all its social and political functions harmonised with the divine morality. Profane and sacred sciences will be length coalesced, all education will become religious, and the instinct of worship will find nourishment in a regenerated theatre and an elevated art. The work of the church meantime is essentially educative and preparatory—itself a means and not an end—and all and every influence combined. And the supreme conception of the invisible church was an attempt to avoid the difficulty of the Catholic theory, but it created a purely spiritual community, separated from the ordinary interests of social and national life, and with a fatal tendency to the error of a divorce between religion and morality, the former emphasising the interests of the individual for eternity, the latter relating merely to his social duties here—in themselves considered as of no religious value.

Rothe's theory deals a deathblow to clericalism and all exaggeration of the importance of the external organisation. It may be that it will be for ages yet to come nothing beyond a devout imagination, but at least it is a splendid attempt to realise the Christian dream of the kingdom of God, to carry into effect Christ's distinction between mere outward form and inward spirit, and the eternal fact that it is in life as God Himself has made it that the power and spirit of the gospel ought to manifest itself. This speculative theory is worked out in the first of the three books of Rothe's unfinished work, Die Aufsaugende Christologie (1837). The remaining second and third books are historical. His greatest work is his Theologische Ethik (3 vols. 1845-48; 2d ed. completed by Holtzmann from his papers, 5 vols. 1869-71), which supplements the preceding book, being based on the same fundamental identity between religion and morality, the starting-point being the idea of God involved in consciousness, and con-
sidered in relation to the world and to man. Here in his pursuit of analogies into the world of science. Rotherham too often leaves behind him the solid earth of reality, and ventures on hypotheses that are little better than visionary, and, moreover, his style is nocebrupt, obscure, and perplexing. *His Dogmatik,* posthumously edited by Schenkel (3 vols. 1870–71), completes his ethics. Here he distinguishes sharply between Revelation itself and the Bible—its documentary record. The former is not so much a supernatural communication of religious truth as an act of God's creative form of God's redemptive activity, strengthening and rectifying the religious consciousness of man disturbed by sin. The true object of Revelation is the knowledge of God; its mode of operation is not magical, but is accompanied by an internal action on the consciousness producing a special receptivity by means of which the external manifestations in history and nature may be understood. It is supernatural in its cause, but natural in its method, although admitting alike of inspiration, of miracle, and of prophecy—of the analogies of nature, but rather inherently constituent elements of a Revelation, subserving higher laws of nature unknown to man's limited faculties, but perfectly homogeneous with a divine order.

During his last ten years, after the formation of the Prussian Empire, Rotherham took an active part in ecclesiastical affairs, as a leader in the School of Conciliation. He was an admirable preacher, but with characteristic modesty could hardly be induced to publish his sermons. Schenkel edited three volumes in 1869, but took unwarrantable liberties with the text, in the way of modifying the supernaturalism. A fourth and reliable volume was edited by W. Höibe in 1872.

The Prolegomena which Rother had contributed to *Studien und Kritiken* he collected under the title *Zur Dogmatik,* and published in 1875. Under his direction was the book already named, there were edited from his papers *Vorlesungen über Kirchengeschichte,* by Weingarten (2 vols. 1875–76); *Abenddankfei der Pastoralbriefe,* by Pfeiffer (2 vols. 1870–77); *Der erste Brief Johanne,* by Mühlhäuser (1875); *Theologische Encyklopädie,* by Kappelius (1880); *Geschichte der Predigt,* by Trümpermann (1881); *Gesammte Fortritte u. Abhandlungen,* by Nippold (1881), also edited by Schenkel (1872); Eng. trans. 1886) and wrote his Life (2 vols. 1873–74).

Rothschild, a town of Bavaria, on the Tauber, 36 miles W. by S. of Nuremberg, preserves its medieval character in great part unaltered. Pop. 6221. The town produces a periodic procession and historic play in memory of its escape from being sacked in the Thirty Years' War, during which the town (then a place of 18,000 inhabitants) was repeatedly taken and retaken.

Rotherham, a busy manufacturing town in the West Riding of Yorkshire, on the right bank of the Don, here joined by the Rother, 5 miles ENE. of Sheffield by a railway opened in 1838. Its manufactures are mainly in cotton and woollen. Its Perpendicular style, with crocketed spire and fine west front. It is probably somewhat earlier than its reputed founder, Thomas de Rotherham, Archbishop of York (1423–1500); in 1875 it was restored by Sir G. G. Scott at a cost of £9000. A handsome edifice in the Collegiate Gothic style, built for an Independent College in 1875 at a cost of £20,000, has been bought for £9000, and applied to the purpose of a grammar-school (1843), at which Bishop Sanderson was educated. There are also a mechanics' institute (1823), a free library (1881), an infirmary (1870); a covered market (1879); public baths (1887); a park (1876) of 20 acres, 300 feet above the town; and the Clifton Park of 57 acres, which, costing £25,000, contains a fine mansion-house, and was opened by the Prince of Wales on 25th June 1891. The manufactures include stoves, grates, chemicals, pottery, glass, railway-carriages, &c. Ebenezer Elliott was a native of the suburb of Masborough, which is included within the municipal boundary, incorporated in 1871. Roselle Abley, a ruin, 8 miles ESE., was a Cistercian abbey, reduced (1542) to a manor, and returned to Conisborough Castle, noticed at DONCASTER. Pop. (1851) 6225; (1871) 25,592; (1881) 34,782; (1891) 42,050. See John Guest's great *Historical Notices of Rotherham* (1879).

**Rothsay,** a favourite Scotch watering-place, the capital of Buteshire, is beautifully situated on the north-east shore of the Island of Bute (q.v.), 40 miles by water W. of Glasgow and 19 SSW. of Greenock. 'Sweet Rothsley Bay,' rimmed by hills 400 to 530 feet high, offers safe anchorage in any wind, and is spacious enough to contain the largest fleet. Its charming scenery, its bathing facilities, its sheltered position, and the extreme mildness of its climate have rendered Rothsley a resort alike of holiday-makers and of invalids, especially those affected with pulmonary disease. Its linen and cotton manufactures, tanning, and boat-building are almost or quite extinct; and the herring-fishery is now the only important industry. The Clyde steamers touch regularly at Rothsley, whose commodious harbour was constructed (1822–84) at a cost of over £30,000. An esplanade was formed in 1870; and among the chief edifices are the county buildings (1822–23), public hall (1879), aquarium (1876), academy (1869), and Glenburn hydrophatic (1843; burned down in 1891, and rebuilt). In the middle of the town are the ruins of Rothsley Castle, founded about 1098, taken by Hacon of Norway (1263), the death-place of Robert III. (1406), Erskine, 1st Earl of Winton, and assigned to min (1651) by the Earl of Argyll; bought by the Marquis of Bute, at a cost of £8000. Rothsley since 1398 has given the title of duke to the eldest son of the Scottish sovereign. Created a royal burgh in 1400, it returned a member from the Union till 1868. Pop. (1821) 4107; (1881) 6229; (1891) 9106. See books by J. Wilson (1848) and Thoms (1870).

**Rothschilds,** the well-known family of bankers, take their name from the sign of the house ("Zum Rothen Schilde,' or 'red shield'"), in the Jews' quarter of Frankfort, in which their ancestors lived. The real founder of the family as financial magnates was Mayer Amschel Rothschild, who was born at Frankfort in 1743. Although educated for a rabbi, he embarked in the banking business at Hanover, and, having saved a little money, started for himself as a money-lender and dealer in old coins in the family home at Frankfort. He won the confidence of the landgrave of Hessia, who entrusted his finances to the Jew's management. The current story, that he successfully hid the fortune of the landgrave from the French invaders in 1806, and was through his patron's gratitude allowed to have the almost unbroken family charters of his house, by this means laid the foundation of a large fortune, is extremely doubtful. The beginnings of his fortune were in all probability less romantic: the Rothschild house got a heavy commission for transmitting money from the English government to Wellington in Spain during the eight years of the Napoleonic war; they managed the large private fortune of the landgrave; through them the British government made its payments of subsidies to continental princes; they negotiated for private fortunes of large loans, and left a mark between 1804 and 1812. At his death, on 13th September 1812, Meyer Amschel Rothschild left five sons, all of whom were made barons of the Austrian empire in 1822.

**Anselm Meyer,** the eldest son, born in 1773, died 1855, succeeded as head of the firm at Frankfort.
SOLOMON (1774–1835) established a branch at Vienna; NATHAN MEYER (1777–1836), a branch in 1798 at London; CHARLES (1788–1855), a branch at Naples (discontinued about 1861); and JAMES (1792–1868), a branch at Paris. Apart from their very extensive private banking business these houses have been deeply concerned in negotiating many of the large securities of the 19th century. The cleverest man of the five was Nathan, who really lifted the house into its position as first amongst the banking-houses of the world. He pinned his faith and staked his fortunes on the success of Britain in her great duel with Napoleon, and is said to have been present himself at the battle of Waterloo, from which he hastened home to London, where, before the result of the battle became known, he had sold and bought stock that brought him one million sterling clear profit. He was succeeded by his son LIONEL (1865–79), who distinguished himself by his efforts to effect the civil and political emancipation of the Jews in Great Britain. The present head of the London branch is Lionel’s son, Sir NATHAN (born 1840), who succeeded to the baronetcy conferred in 1847 on his uncle. He was raised to the peerage as Baron Rothschild in 1885. His niece Hannah (1831–99) was in 1877 married to the Earl of Rosebery. See Reeves, The Rothschilds (1887), and Das Haus Rothschild (Prague, 1857).

**Rothsfe.** See ROTATORIA.

**Rotomahana.** See NEW ZEALAND, p. 487.

**Rotron, Jean de,** a French tragic poet, second only to his friend and contemporary Corneille, was born at Dreuax, August 21, 1609, went early to Paris, and became a bullfighter, as well as one of the five peers—the others were Corneille, Colletet, Bois-Robert, and L’Etouli—who worked up into dramatic form the ideas of Richelieu. His first piece, L’Hypochondriaque, was followed by La Bague de l’Epee, an imitation from Lope de Vega, and that by Cleangusor et Doristae, Diene, Les Occasional Perdues, L’Heureuse Constance, all in the Spanish romantic style. Next followed a busy period of classical dramma, culminating in his last years with three masterpieces, Le Veritable Saint Genes, a tragedy of Christian martyrdom under Diocletian; Don Bertane, a comedy; and Venecia, which kept the stage almost down to our own day. Tradition tells that Rotron led a dissipated life in Paris, and further was inordinately addicted to gambling; more honourable is the authentic history of his death. He held an official post at Dreux, and when he heard that the plague had broken out there, himself that the Tournaians had fled like Montaigne in the same circumstances from Bordeaux, he hastened to the town to preserve order, caught the pestilence, and died a few hours after, June 23, 1650.

As many as thirty-five of his plays are still extant, but many more are lost. A complete edition was edited by Violet-le-Duc (5 vols. 1820–22); six of the plays, by M. de Rondard (2 vols. 1822). See Jarry’s Études (1683), the works by Person on Saint-Genes (1862) and Venecia (1863), and G. G. Stenver’s L. (1881).

**Rotenburg,** an episcopal town in Württemberg, 6 miles SW. of Tübingen, on the Neckar, has an old castle, now a prison, and a cathedral, and trade in hops and timber. Pop. 7,310.

**Rottenstone,** a soft and earthy stone, consisting chiefly of alumina, with about 10 per cent. of carbonaceous matter and a little silice. It is sup-

### Rotterdam

**Rotterdam,** the busiest port of Holland, stands on both sides of the Maas, 10 miles from its mouth, and 16 miles by rail SE. of the Hague and 45 SW. of Amsterdam. Since Holland was separated from Belgium, the trade of Rotterdam has grown at an extraordinarily rapid rate, especially since the middle of the century. New wharves and quays and new docks have been built almost every year since 1847. In 1888 the quays measured 16 miles in length and the docks covered an area of 190 acres; and since then two new docks have been made and the (separate) petroleum wharves have been extended. Since 1872 sea-going vessels have ceased to approach Rotterdam by the old channel of Brill (Brillie); they have used instead the New Waterway—i.e., the Maas and the Scheur, the latter of which has been connected with the sea by a canal cut through the Point (Hoek) of Holland. Every effort has been made to render this new waterway available for large ocean-going steamers, and the work of improvement has been constantly going on ever since it was opened, until in 1890 it had a depth never less than 22 feet at low tide, and big ships were able to reach the sea in two hours from Rotterdam. Taking all the vessels that enter all the ports of Holland from a road, more than 53 per cent. (estimating by tonnage) enter at Amsterdam. The net tonnage of the vessels (which numbered 4,535 in 1890) so entering doubled between 1875 and 1890, and was in the latter quoted year eight times what it was in 1850—viz. 2,918,425 tons in 1890 as against 1,411,828 in 1875, and 346,186 in 1850. To this foreign trade must be added 84 per cent. of the total trade between Germany and Holland by way of the river Rhine, or (in 1890) some 2,582,800 tons, and a traffic of 6,850,000 tons carried on in the inland canals and streams. If all these items be put together the total tonnage of vessels entering Rotterdam annually is nearly 121 million tons, a figure that is only exceeded by London amongst European ports. But, on the other hand, it must be remembered that the bulk of the inland traffic would in other countries be counted amongst the statistics of goods brought by railway. The figures quoted do not include the returns of the shipping fleet, which sells in Rotterdam fish (chiefly herring, cod, &c.) to the value of £20,000 per annum. The merchant fleet of Rotterdam itself numbered, in 1899, 150 vessels of about 369,000 tons. The imports consist principally of mineral ores and
metals, grain (wheat, rye, oats, maize), coal, oil (petroleum chiefly), seeds, tallow and similar greasy substances, sugar, rice, tobacco, hides, indigo, &c.; whilst the more important exports are linen, flax, butter, cheese, cattle, and spirits (gin, &c.). From this period the yearly average between 2300 (1885) and 15,300 (1889) emigrants from the most parts of Europe, most of whom go to the United States. There are flourishing industries, as iron and other metal works, shipbuilding, distilling, sugar-refining, and the manufacture of tobacco, chemicals, &c.

The town is connected by railways which communicate with the Maas, whilst their banks serve as wharves. On the south side of the river, opposite the city proper, are the busy ironworks and shipbuilding-yards of the island of Fijenoord, besides some of the largest docks. This island is connected with the other bank by two lofty bridges (one a railway bridge). In the city the more important buildings are the Gothic church of St Lawrence (15th century), with a very large organ, the monumental tombs of the Dutch admirals Witt, Cortenaer, Van Brakel, Van Liefland, others, and a lofty tower (295 feet high); the Boyman's Museum (1847), with a fine collection of paintings by Dutch masters; the yacht club-house, containing an ethnological collection; the town-house, exchange, and other public buildings. The public institutions include an academy of arts and sciences (near 1100 pupils), schools of music, navigation, and the technical arts, and an excellent zoological garden. Pop. (1890) 203,472, with which compare the figures for earlier years—7,500 in 1630, and 104,724 in 1855. Rotterdam counts as her most illustrious sons Erasmus and the poet Tottens; James, Duke of Monmouth, and Grining Gibbons, the English wood-carver, were also born here. The history of the place is marked by very few notable events, except its capture in 1637 by François de Brederoel in 1488, who lost it to the Austrians in the following year, and the occupation by the Spaniards in 1572.

Rottli, an island in the Indian Archipelago, belonging to the Dutch, lies to the south-west of Timor. It is 36 miles in length (655 sq. m.), and has a pop. of 60,000. The surface, though hilly, is now covered with rice above the sea, and the fertile soil produces a rich vegetation.

Rottlera, a genus of trees of the natural order Euphorbiaceae, found in India and other parts of tropical Asia. The most important species is Rottlera tinctoria (Roeburgh), subsequently called after Malus philippinensis. It is a small tree, the wood of which is of value, but its bark is employed for tanning, and the crimson powder which covers the ripe fruit is used for dying silk, and also as a purgative and anthelmintic.

The R. tetraecu and R. petiolaris of Roeburgh have also been included in the genus Mallotus by Müller under the names M. albus and M. roxburghianus.

Rottweil, a town of Württemberg, on the Neckar, 68 miles by rail S. by W. of Stuttgart, has manufactures of gunpowder and silk and cotton factories, and railway workshops. Near by, on the site of an ancient Roman colony, a number of antiquities, including a valuable piece of mosaic work, have been discovered. Pop 6052.

Rotunah, an island in the south Pacific, annexed to the Fiji Islands by Great Britain in 1881, is distant about 300 miles NNW. from the nearest island of that group, of which it is a dependency. Area, 14 sq. m.; pop. 2900, all Christians.

Roturier (according to Littre from ruptura, Low Latin for ground broken by the plough), under feudalism, when the feudal theory of knight's service was recognised as the only principle of gentle tenure, one who continued to hold by the older or alodial tenure, and was accordingly regarded as incapable. See FEUDALISM, ALLODIUM.

Roubaix, a town in the north of France (dept. Nord), 6 miles by rail NE. of Lille, it rose into importance during the 19th century. Here is a market for men's clothing, shawls, stuffs for furniture and ladies' dresses, velvet and similar textiles, chiefly of wool, cotton, and silk, are manufactured to the annual value of £6,000,000. Besides these things, thread, sugar, beer, spirits, &c., are produced, and there is a very active trade in these manufactured goods. Pop. (1810) 9000; (1876) 74,846; (1891) 103,191.

Roulliaee, Louis-Francois, sculptor, was born at Lagny in 1835, studied mainly at Paris, where in 1730 he obtained the second Grand Prix, and shortly thereafter settled in London. In England he espied his name Roullie. He visited Rome in 1745. His statue of Handel for Vanxhall Gardens in 1738 first made him popular. His other most famous statues are those of Shakespeare (executed for Garrick, and now in the British Museum), of Sir Isaac Newton at Cambridge, and another of Handel in Westminster Abbey. The monuments of the Duke of Argyll and of General Wade in the Abbey are also well known. He contributed largely to the development of British taste in sculpture, though his own work did not mean so perfect as his contemporaries imagined; he has been called an exquisite executant but poor designer. He died in London, 11th January 1762. See the Life by Le Roy de Sainte-Croix (Paris, 1882); A. Dolson in Eighteenth Century Vignettes (1894).

Roule, the unit of the Russian money system, first cut from silver bars in 1321, and coined in 1655. There are now gold imperial and half-imperial of 10 and 5 roubles. But most of the currency is paper, and the ratio of the gold rouble to the paper rouble was in 1856 fixed at 1 to 1. In 1897 imperials and half-imperial were coined of 15 and 75 roubles (i.e. paper roubles). The silver rouble is nominally worth 3s. 2d. But when silver is at 20d. per oz., it is really worth 1s. 4d.; at 30d. per oz. 1s. 6½d. In 1888 silver was 42½d.; in 1890, 47½d.; in 1894, 29d.; in 1895, 26½d. The rouble is divided into 100 kopeks.

Rouen (Lat. Rotomagus), formerly the capital of Normandy, and now the chief town of the department of Seine-Inferieure, and after Lyons perhaps the principal manufacturing city of France. It stands on the River Seine, 87 miles N.W. of Paris by railway. The ramparts have been converted into spacious boulevards, little inferior to those of Paris. The modern streets are well and regularly built, with good stone houses; but a considerable part of old Rouen still remains, consisting of ill-built picturesque streets and squares, with tall, narrow, quaintly carved, wood-framed and gabled houses. The Seine, upwards of 300 yards broad, makes Rouen, although 80 miles from the sea, the fourth shipping port of France; and the great tides, in the way of deepening the river and building quays, are yearly adding to its capacity and importance, no less than £710,000 having been expended on the port between 1851 and 1857.

A stone bridge and a suspension bridge lead to the Faubourg St Sever on the left bank. Rouen possesses several remarkably beautiful Gothic churches—in particular the cathedral (13th century onwards), St Ouen (14th-15th century; perhaps the finest of the times of Gothic in existence), and St Maclou (florid style of the end of the 13th century). The cathedral, the seat of an archbishop, begun by Philippe Auguste, has a very rich west façade, and two fine though unfinished west towers—the south one (Tour de Burre)
was built (1455–1507) with indulgence money received for permission to eat butter during Lent— but is reputed to be a lofty cast-iron spire (487 feet) erected upon the central tower in 1876 in consequence of an old wooden belfry, which bore the date 1544, having been destroyed by fire in 1822. It contains in its twenty-five highly ornamental chapels numerous tombs and monuments of great interest, of Rollon and his son William Longsword. The heart of Richard Cœur de Lion, once buried there, is now preserved in the extensive Museum of Antiquities. Among other noteworthy buildings in Rouen are the palais de justice (13th century) and the hotel de ville, with its public library of 110,000 volumes, and its gallery of pictures; and the Hôtel Dieu, one of the largest of its kind. The principal branches of industry are cotton manufactures, including the checked and striped cottons specially designated Roumaines, nankeens, muslin, cotton-vetements, shawls, &c. Rouen has also extensive manufactories of hosiery, mixed silk and wool fabrics, blankets, flannels, hats, cordage, cotton and linen yarns, shot, steel, lead, chemicals, paper, confectionery (Sucre de pomme), &c. There are also engineering works. Pop. (1872) 102,476; (1891) 112,109.

History.—Rouen is specially interesting to Englishmen as the capital of the Northmen in France, and the first home of the Norman dukes. It was the scene of the baptism and marriage with Gisela, daughter of Charles the Simple, after that monarch had been constrained to cede Normandy under the treaty of Claire-sur-Epte (912), and there he and his successors lived until Duke William transferred his court to Winchester after the conquest of England (1066). At Rouen William died (1087), and till the time of John it continued the seat of government of the Norman possessions of the English kings. In 1204 it was taken by siege by the French king Philippe Auguste, and annexed along with the main part of the duchy to the French crown, in which state her situation, and which is called in memory of her Place de la France. Rouen was the birthplace of Cornelle (1606), of Fontenelle (1657), of Boieldieu (1773), of Armand Carrel (1800), and of Flaubert. Clarendon died here. It was occupied by German troops in 1792–71. See Fouquet's Histoire de Rouen (1875), and other works cited at NORMANDY.

ROUERGUE, an old province of southern France, between Languedoc, Auvergne, and Gienne, ruled by counts until 1589, when it passed to the crown. See FRANCE, Vol. IV. p. 770.

ROUGE, a powder used to give artificial colour to the cheeks. For common purposes vermilion rubbed up with almond-oil is employed, but the safer and better quality is prepared from carmine (the colouring matter of cochineal), either alone or mixed with the safflower colour. These are generally rubbed up with French chalk, and supplied either as powder or, along with a little oil, in the form of saucers.

Jeweller's rouge is an impalpable preparation of oxide of iron, obtained by gently heating the yellow rust of iron, after decomposing the chromic acid escaping, and only a red powder being left. It is used for polishing silver, and for this purpose should be of the finest quality. Many cheaper varieties are sold under this name.

ROUGE CROIX, DRAGON. See HERALD.

ROUGE ET NOIR (Fr., 'red and black'). TREnte-EN ('thirty-one'), or TREnte ET QUARante ('thirty and forty'), is a modern game of chance, which is played by the aid of packs of cards on a table covered with green cloth. The table is of a form similar to that shown in the figure. It is divided into four portions, each marked in the centre with a diamond, the diamonds being alternately red and black; and these quarters are further separated, two and two, by bands which cross the table at its narrowest part. At the end of the table are a series of concentric bands painted either a yellow colour (not represented in the figure). The game is played as follows: one of the tailleurs (or dealers, who manage the table, take charge of the bank, and keep an eye on the players) takes up his position at one side of the table, opposite to the croupier (another tailleur), and unseals, in the presence of the players, six packs of cards, which are first counted, then shuffled by several tailleurs, and returned to the first tailleur, who presents them to one of the players to be cut. This is performed by the insertion of a blank card in any part of the pack, which is then adjusted, and the game proceeds. Each player must stake his money on some one of the four chances, denominated noir, rouge, couleur, and Paire, which will be afterwards explained. After the stakes have been laid on the table (those for the noir being laid on either of the quarters marked with a black, and those for the rouge on either of the quarters marked with a red diamond), those for the 'couleur' on one of the transverse bands, and those for the 'inverse' on one of the yellow circles at the end of the table), the tailleur takes a handful of cards from the top of the pack, and deals first for the noir, taking one card after another from the top of the pack, and placing them on the table side by side, till the number of pips on them amounts to more than thirty, when he stops. He then deals out another row in a similar manner for the rouge, till, as before, the number of pips amounts to more than thirty. In reckoning the number of pips, the ace is counted as one, the other plain cards according to the number of pips, and the court-cards ten each. It will thus be seen that the number to which each of the two rows of cards amounts, must be more than thirty and not more than forty. If the value of the first row is nearer thirty-one than that of the second, then the first row, or noir, wins; if the contrary is the case, then the second row, or rouge, wins. Couleur wins if the first card talked by the tailleur is of the winning colour—for instance, if the first card laid down is a 'spade' or 'club,' and if noir wins; but if the first card dealt is of the winning colour, then inverse wins, and couleur loses. Two (and no more) of the four chances can be winning chances at one time; and the winning players have their stakes increased by an equal sum from the bank, and then withdraw their stake and winnings, while the stakes of the
losers are raked by the tailleurs to the bank in the centre of the table. When the value of the first, or no balls, is reaped, a new turn is taken, and if a row, it is a refait, and the dealer must commence to deal anew from the cards remaining in his hand; when the refait occurs the player may either withdraw his stake, or stake on a different chance, with the same or more or less money as he thinks proper. The game of Roulette would be impossible between the players and the bank were it not for the following regulation: When the points dealt for the noir and the rouge each amount to thirty-one ('un refait de trente-et-un') the half of all the 'en playing pieces belongs to the bank, and this the players may either pay or have their stakes 'put in prison,' the next deal determining whether they shall belong to the bank or be restored to the player. If a second doublet of thirty-one occurs in the deal immediately succeeding, the stakes which were in prison are diminished by one-half, which goes to the bank, and the other half is 'put into the second prison,' from which it requires two successive winnings of the player to regain them. The chance of 'un refait de trente-et-un,' as it is called afterwards, is given to this game by a superseeded Faro (q.v.) and Biribi in France about 1789, but along with Roulette was forbidden by law in 1838. See work cited at ROULETTE.

**Rouget de Lisle, Claude Joseph**, author of the Marseillaise (q.v.), was born at Lyons-Le-Saulnier on 10 May 1760. When in 1792 he wrote and composed his celebrated song, he was a captain of engineers stationed at Strasburg. Four months later, as too moderate a republican, he was imprisoned in Paris, but was released after Robespierre's fall. Wounded at Quiberon (1796), he quitted the army, and lived in Paris in narrow circumstances, until Louis-Philippe, who superseded him as minister of the interior, was awarded him a small pension. He died at Choisy on 26 June 1836. He published in 1796 a volume of Essais en Vers et en Prose; but none of the pieces it contains, nor indeed any of his other books, possess much real merit. The Marseillaise was his one inspiration. See a Memoir by Poisie-Desgranges (Paris, 1864), and one by tiersot (1892).

**Rouhier, Eugene**, a French statesman, was born at Riom, on November 30, 1814, practised there as an advocate up to 1843, and then was returned to the Constituent Assembly. Towards the end of 1792 he was appointed minister of Justice; and with slight interruptions he was for twenty years a member of the French government. He was chiefly instrumental in negotiating the treaty of commerce between France and England in 1850, and that between France and Italy in 1856, and was thus instrumental in preparing the way for the introduction of the free-trade policy of Napoleon III. In 1863 he was appointed minister of State, and maintained that position until 1870, when he became president of the Senate. A staunch supporter of Napoleon III, and a clever debater, Rouhier was next after the emperor, the chief supporter of the system, domestic and foreign, which came to a disastrous end at Sedan—he was sometimes called the Vice-emperor. After the fall of the empire he fled abroad. But he was returned to the National Assembly for Corsica in 1872, and sat till 1875 as a staunch defender of the emperor. He died at Paris, 31 February 1884.

**Roulers** (Eenm. Rousselers), a town of West Flanders, Belgium, 19 miles by rail SSW. of Bruges, has manufactures of cottons, lace, and clothing. The town is a junction, defeated the Austrians on 13 July 1794. Pop. (1887) 19,735; (1896) 21,693.

**Roulette** (Fr., 'a little wheel'), a game of chance which from the end of the 18th century till the beginning of 1838 reigned supreme over all others in Paris. It continued to be played at 8,000 francs was wagered on two lines, and as in terms of an act passed four years before Roulette then found a home at Monaco. It is played on a table of an oblong form, covered with green cloth, which has in its centre a cavity of a little more than 2 inches in diameter, into the shape of a punch-bowl. The cavity is richly described, and copper bands round its sides at equal distances from each other, has its sides fixed, but the bottom is movable round an axis placed in the centre of the cavity, the handle by which motion is communicated. The number of chances last described are numbered 38, of red and double zero; and these 38 symbols are also numbered at each end of the table in order that the players may place their stakes on the chance they select. Along the margin of the table and at each end of it are painted six words—pair, passe, noir, impaire, manque, rouge, which will be seen from the following table and the drawing: The game is played as follows: One of the tailleurs puts the movable bottom in motion by turning the cross with his forefinger, and at the same instant throws into the cavity at intervals an opposite to the motion of the bottom; the ball makes several revolutions, and at last falls into one of the 38 holes above mentioned, the hole into which it falls determining the gain or loss of the players. A player may stake his money on 1, 2, or any of the 38 numbers (including the zeros), and shows what number or numbers he selects by placing his stake upon them; if he has selected a number or zero corresponding to the one into which the ball falls, he receives from one of the tailleurs 36 times his stake—viz. his stake and 35 times more—if he selected only 1 number, 18 times if 2 numbers, 12 times if 3 numbers, &c. The blank rectangles at the bottom of each of the 3 columns of numbers figured on the table are for the reception of the stake of that player who selects a column (12 numbers) or a series of chance, and to the odd or even position of the ball. If the ball enters a hole the number of which is found in his column, he is paid 3 times his stake. Those who prefer staking their money on any of the chances marked on the edge of the table, if they win immediately receive double their stake (in 13 cases much more), and under the following circumstances: The 'pair' wins when the ball falls into a hole marked by an even number; the 'impair,' if the hole is marked odd; the 'manque,' if the hole is numbered from 1 to 18 inclusive; the 'rouge,' if it is coloured red; and the 'noir,' if it is coloured black. If the ball should fall into either of the holes marked with the single or the double zero, the stakes of those players who have staked upon chance are divided equally between the bank and the players, or as is more commonly the case, they are 'put in prison,' as it is called, and the succeeding trial determines whether they are to be restored to the players or gained by the bank. Should it so happen that the trial the ball again falls into one of the two holes marked with zeros, then half of the stakes in prison are taken by the bank, and the remainder are 'put into the second prison,' and so on. The tailleurs thus have an advantage over the players, who bet upon the numbers: labours under a similar disadvantage, for although the two zero-points do not affect him in the same way as the player who stakes upon one of the other 6 chances,
still (supposing him to bet upon a single number) as the chances are 37 to 1 against him, he ought to receive 37 times his stake (besides the stake) when he wins, whereas he only receives 35 times that amount, a manifest advantage in favour of the bank in the proportion of 37 to 35. See Professor J. S. Bond, The Problems of Roulette and Trente et Quinante (New York, 1889).

Roumania, a kingdom in the south-east of Europe, situated between 23° 29' and 29° 42' E long., and between 42° and 48° 45' N lat. Its general boundaries are on the east and south the river Pruth and Danube (with the exception of the Dobrudja, a province south of the latter river at its embouchures), and on the west and north the Carpathian Mountains, along whose heights the boundary line runs. The kingdom presents the form of an irregular blunted crescent, some writers comparing it to a sausage. Its average length is about 335 and its breadth about 188 miles; its approximate area is 49,250 sq. m., and its population (1895) was 5,417,260, including 290,000 Gypsies. Of these 45 millions, belong to the Greek Church (the national religion), and the remainder are Protestants, Jews, &c. There are believed to be about 4,000,000 of Roumanians outside the Roumanian kingdom—in Hungary and Transylvania, Bulgaria and adjoining Russian provinces, Servia and Bulgaria.

The general configuration of the surface of Roumania is an irregular inclined plane, sloping down from the Carpathian Mountains to the northern bank of the Danube, and it is traversed by numerous watercourses (many of which are dry in summer), taking their rise in the mountains and falling into the great river, which render the country well adapted for every kind of agricultural industry. Roumania is divided, roughly speaking, into the two provinces of Wallachia and Moldavia, the first being the Danube, the second on the Pruth. These were formerly distinct principalities, were then united as Moldo-Wallachia, and finally incorporated as an independent kingdom under Charles I. The capital of Roumania is Bucharest in Wallachia, about 30 miles from the sea. The chief town. Moldova, is Iassy, not far from the river Pruth. The other towns of any note in Roumania are the seaports of Galatz and Ibrail (or Braia) at the mouth of the Danube, Craiova (Krajova), Botoshani, Ploesti (Plojeschi), Piesti, and the ancient capital Curtea de Arges. Roumania possesses one of its beautiful cathedrals, built of a grayish-white limestone resembling alabaster, in the Byzantine order of architecture, with a profusion of Moorish or Arabesque ornamentation.

The most noteworthy peaks of the Carpathians rise from 3000 to 3600 feet above the sea-level, the highest two being Caraiman and Verful, from which a distant view of the Balkans, in Bulgaria, is obtainable in clear weather. Near the foot of Caraiman, at the junction of three valleys, and surrounded by lovely wooded slopes, nestles the charming summer-resort of the court and upper-class, Sinaia. Here the king and queen occupied an old monastery until a beautiful palace was built in the Italian style, where the court spends a considerable portion of the summer. Besides the palace there are many handsome private residences, as well as a public library (in 1892 there were in the palace 13,424, with a tonnage

near Campina, as well as elsewhere, and there are refineries at Tirgovista, Ploieschi, &c. The chief products of agriculture are maize and cedars, which are largely exported, and amongst the fruits of the country peaches, pears, apples, pears, and grapes are conspicuous and plentiful. The sylvan scenery of the Carpathians is very lovely, and either there or in the plains are to be found the oak, elm, beech, and, less frequently, the maple, sycamore, mulberry, lime, horse-chestnut, and acacia. The usual flora of the sub-tropical and temperate zones flourish luxuriantly, and at Ferestrem, near Bucharest, there is an excellent agricultural and sylvicultural college. The manufacturing industries of the country are still in their infancy, and are greatly handicapped by the cheap productions of Germany and Austria. They include flour and saw milling, match-making, and petroleum-distillation, to which have been added (through an act passed in 1887 for encouraging Roumanian industry) tannin, boot and shoe making, and cement manufacture. Notwithstanding the large importation of manufactured articles of various kinds from Austria, Germany, France, and Great Britain, the peasantry are mostly clothed in garments made by themselves of home spun, woven, and embroidered fabrics, and they possess such taste and skill in the manufacture and ornamentation of cloth, gauze, and muslin, and in the trimming of costumes, that their work finds a ready market in the best establishments in the capital.

The most remarkable feature in the agricultural system of Roumania is its peasant proprietor, which was created about the year 1864. Before that year the whole of the land of the country was practically held by the boyards or inferior nobles, who were frequently absentee, or by the state, for the peasants merely owned small patches of land contiguous to their dwellings, which were now and again, by some semi-subterranean sleight of hand, robbing of their land during long ages of feudal oppression and foreign conquest, but when the government became democratic it was determined to restore a portion of it (about one-third) to its rightful owners, and to otherwise have fallen into the hands of usurers. The result was that in 1890 there existed in Wallachia and Moldavia, 406,933 holdings, averaging 10-6 acres each, and the great change has added materially to the prosperity of the country and its thrifty peasantry.

The government of Roumania is a hereditary limited monarchy, and the constitution provides for an irresponsible king, who must belong to the Orthodox Greek Church; a council of ministers; a senate and a chamber of deputies. The members of both houses are indirectly chosen, mainly by colleges of voters; but the large towns elect directly. Senators are elected for eight years, one-half retiring every four years. Members of the lower house sit for four years, but either chamber may be dissolved separately. The income of a senator is proportioned to the number of shareholders at the most important political institutions in Roumania is largely concerned is the 'Danubian Commission' (see Danube), whose headquarters are at Galatz. There is a British representative in the Carpathians. This is rendered necessary by the great preponderance of British shipping, and the total number of vessels which cleared from the Danube at Sulina in 1897 was 1324, with a tonnage
of 1,397,917, the proportion of British vessels (all steamers but four) was 544, of 855,477 tons, and those figures form approximately the proportion during recent years. The following statistics, conceivably stated, show the financial and commercial position of the country at the beginning of her commercial relations with Great Britain.

In 1895 the National Debt was £74,585,890, paying over £3,000,000 annual interest; revenue, £7,814,000; expenditure, £7,486,997. The permanent army comprises 60,000 officers and men. The total exports of all kinds were valued at £16,902,000; total value of imports, £13,516,000; total value of domestic manufactures, £3,118,500; total value of exports from Roumania to Turkey, £3,017,000; (in 1896, £1,366,593.

History and Political Rule. Tenure of an early Greek historian mention Thracian tribe, the Gete, from whom were descended the Dacians, a brave race who occupied the northern side of the Ister or Danube, and flourished as a free people down to about the end of the first century of our era. Before that time the Dacians had come into conflict with both Greeks and Romans, but in the year 101 A.D. the Emperor Trajan undertook the first of two expeditions against their king, Decebalus, which terminated in the complete subjugation of the country. Traces of the battle were still to be found in the military road constructed by Trajan along the banks of the Danube, including a commemorative tablet, and in the piers of a bridge across the river near Orsova. Pressed by the barbarian races who eventually compassed the downfall of the Roman empire, Dacia, which had been a constituted Roman colony, was evacuated by the Romans in the reign of Aurelian (about 274 A.D.), and for about a thousand years the banks of the Danube served as halting-places for the first-named wandering tribes. The most conspicuous were the Goths; the Huns under Attila; the Lombards under Alboin; the Bulgari, who afterwards settled on the plains south of the Danube and founded Bulgaria; the Ungri, a savage race who settled in Hungary; and the Walachia, from whom Wallachia has derived its name. For a considerable period both banks of the Danube were governed by the sovereigns of what is known as the Wallachio-Bulgarian dynasty, which was brought to a close by a Tartar invasion about the year 1250 A.D. A Roman invasion followed and the number of smaller states an independent realm in Wallachia, with its traditions of heroes and chiefs, Mircea the Old, Michael the Brave (whose memory is perpetuated by a beautiful equestrian statue at Bucharest), and others; whilst the neighbouring state of Moldavia had also its heroes in Stephen the Great, &c. These rulers for a long time resisted the Musulman advance, but were eventually reduced to vassalage by the victorious Turks, and were compelled to sign what are known as the 'Capitulations,' by which they were bound to the sultan. The first treaty with Wallachia known by that name was signed as far back as 1393; but that with Moldavia, which country was supported by the king of Poland, followed as late as 1512.

Although Wallachia and Moldavia thus became states tributary to the Porte, they retained sufficient independence to be in a sense autonomous; but in the course of time their princes, or voivodes as they were called, were Turkish nominees, whose tenure was determined by the fact that in the course of ninety years (from 1723 to 1812) the government of Wallachia passed through the hands of no less than forty of these rulers. They were mostly Greeks, known as Phanariotes or Fanariots (q.v.), who during their brief tenure of power practised the most scandalous extortions upon the people, in order to enrich themselves and remit the annual tribute to Constantinople. The great majority of those Fanariot voivodes either were assassinated or were disgraced through the intrigues of their rivals at the Sublime Porte; and some of them died by their own hand, too worn out by the misfortune or tenure of power for the support of Russia, which country was constantly at war with their suzerain.

The Muscovites began to make inroads into the Danubian principalities as early as the year 1700, under Peter the Great, and continued to invade them at intervals, especially in the reign of the Empress Anne in 1755 and in that of Catharine IV. in 1768. In the first instance the Czar Peter was invited to enter the states by the voivodes Brancovan of Wallachia and Cantemir of Moldavia, who desired to secure their independence under his protection; but no such inducement was afterwards requisite; and although the Russian invasions and occupations were always undertaken on the pretext of liberating the Christians from the Musulman yoke, the real motive was to advance step by step to Constantinople and to secure possession of the whole Balkan peninsula. At different times the Russians exercised absolute sway in the principalities, notably from 1795 to 1792 and from 1806 to 1812, when the princes under their protection deemed it expedient to pay the requisite tribute. This tributary state, the name. In 1848 they helped to suppress the national rising there, as they did in Hungary, but in 1853, before the Crimean war, their power began to wane. At the termination of that war they were compelled by the allied powers to cede Bessarabia to the principalities.

In the year 1859 both principalities elected Prince Cuza (born at Galatz, 1820) as their ruler, and he reigned in Roumania, as the united provinces were then called, until 1866, when he was deposed on account of his connexion with the Russian and Slavonic word. It was succeeded by Prince Charles of Hohenzollern. This revolution was mainly led by two able statesmen, Bratiano and Rosetti, who may be said to have been jointly the counterpart of the Italian Cavour, and who for many years enjoyed great popularity as the chief ministers of state. On the outbreak of the Russo-Turkish war in 1877 the Roumanians espoused the Russian cause. Prince Charles was actually appointed commander-in-chief of the allied armies, the Russian Cesarowitch serving under him. The event was the first redoubt, the Grivitsa, at Plevna, thereby enabling the Russians to reduce that stronghold and bring the war to a triumphant close. The conquerors, however, deprived their allies of part of their territory, Bessarabia, giving them in exchange the Dobruja, which they exacted from the Porte—an exchange laid down in the treaty of San Stefano, and subsequently confirmed by the Berlin Conference (June 1878), when Roumania was re-recognised as a completely independent power. The effect of this treaty however, has been unfortunate for Russia in two respects. It has caused a permanent estrangement between the Roumanians and their guardian allies, and the Dobruja has served as a barrier against Russian aggression in Bulgaria. In 1881 Prince Charles was invested with the kingly dignity with the acquiescence of the European Powers, and since that time, although there have been ministerial crises, and although the Russians have continued to exercise an interest on the part of Roumania, but from then on, in Bulgaria, the Roumanians have practically freed themselves from Russian as well as Turkish influence, and have taken their place amongst the independent nationalities of Europe.

The various conquerors who have at one time or another occupied Roumania have left their traces
in her language and customs. The social condition of the middle and upper classes bears traces of the libertinage of their barbarian conquerors of the Mussulman as well as of the Christian faith. The peasantry are a hardy and thrifty race, and in the highest circles of society the influence of Queen Carmen Sylva has been throughout beneficent. As her marriage left no heir, the succession to the throne passed to Prince Ferdinand of Holstein-Glottenhain (born in 1865), the nephew of the king.

Language and Literature.—Roumanian (or Walachian) is one of the Romance Languages (q.v.), a daughter of the Latin; but, though the language is unmistakably Romance in type, the vocabulary is mixed, the number of Latin roots being variously estimated at more or less than half of the total, the next greatest element being Slavonic words (amounting, according to some authorities, to even more than the Latin roots), with some hundreds of Turkish, Greek, and Albanian words. Most Roumanians speak what is practically the same language—the Daco-Roumanian—throughout the kingdom, in Transylvania, in the Banat, and other parts of Hungary, Bukowina, and Bessarabia. The Macedo-Roumanian, south of the Danube and amongst the Balkans and Pindus, is largely modified by Greek; and the Istro-Roumanian spoken by 2000 or 3000 in Istriot and Croatia, has been much Slavonised.

Roumanian literature may be said to date from the 17th century, though the first Roumanian book was a psalter, was printed in 1577. The chronicles of the 17th century are the earliest specimens of national literature; but Greek was long the language of the educated, and it is only since the beginning of the 19th century that there is a popular Roumanian literature, the most interesting part of it being the songs. Of these Alexandri (q.v.), himself the most noted of native Roumanian poets, made a full collection (1866). Other names are Alexandrescu, Eminescu, and Socherhansesc. There are German translations by Carmen Sylva (q.v.), Kotzebue, and others. Dora D'Istria (see GIHKA) wrote mainly in French. Among authorities on the language are Hasdeu, Miklosich, Gaster, and Titkin, and there are histories of the literature by Ciprian, Bensaulian, Gaster, Popidu, and Philippe (1894). The great dictionaries are those of Codrescu (1875), Laurian and Massinu, Dictionarul Limbez Romanie (2 vols., 1876-79), and Hasdeu, Etymologicum Magnum Romanie (parts i and ii, 1886-92); and there are standard Chrestomathies by Gaster (new ed. 1891) and Pompilius. There are German translations of Roumanian folktales, poems, and songs by Albert Schott (1845), Wite Krenzirtz (1882-83), and Rudow (1888).

See works on Roumania in Roumanian by Aurelian, Teza Nostra (1888); in French by Bezeau and Mathereal (1878), Harsenberg (1886), and Bley (1896); in German by Henke (1877), Bergner (1887), and Benger (1896); and in English by the present writer (1882) and Mrs Walker (1888); the Histories by Laurian (1873), Hasdeu (1874), Cogolinovano, Schinkai, Tocilesuc, Vaceescu, Durmuszaki, Stoudza (1886), &c.; Lavelle, The Balkan Peninsula (trans. 1887), W. Miller, The Balkans in the 'Story of the Nations' series (1896), and other books named at Balkan Peninsula; the Roumanian official statistics; and a long series of English consular reports and Board of Trade returns.

**Roumanille, Joseph** (1818-91), born at St Remy (Bouches-du-Rhone), was successively teacher, printer's reader, and bookseller, and obtained the fame of being the greatest of modern Provençal poets, next after Mistral. He was one of the founders of the association of the Félibres (see PROVENCAL LANGUAGE AND LITERATURE).

**Roumilia** (Turk. Rum Hî, 'land of the Romans'—the inhabitants of the Western Roman empire, or Byzantine Greeks, being known to the Turks as 'Romans'), a name which once applied generally to the whole of ancient Thrace and part of Macedonia. The province aptly enough called Eastern Roumilia is now incorporated with Bulgaria (q.v.). In central Asia Rum or Rumi means the peoples of western Asia; but the Sultan of Turkey is Rum-Padschah. In Turkey itself Rum means now usually the Greek nation and the Greek Church.

END OF VOL. VIII